50 RANDOM NUMBERS

If you use the RND function on its own you will get a result which falls between 0 and 1. It is, of course, real and contains a decimal point. Try PRINT RND and you will see the effect.

In order to get a range of integers you must use the INT function. For instance, you may want to find a random number in a dice throw, one to six. To do that you would use the formula:

INT(RND end-of-range) start-of-range

The dice would, therefore, be simulated using:

PRINT INT(RND*6) + 1

If, however, you wanted a range between three and seven you would type:

PRINT INT(RND*7) + 3

The random number generator can also be set by using RAND, followed by a number or not. Random numbers are not calculated: they are looked up in a table of figures. If you type RAND 3 the Spectrum will start by giving the third number in the table followed by the fourth and so on.

If RAND is used without a number the computer will start at a point determined by the number of separate television frames generated since the Spectrum has been switched on. That should be random enough for you.

sinclair user

50 TIPS FOR BETTER SINCLAIR COMPUTING



0 INTRODUCTION

Programming can be fun but often you will want to produce an effect on the computer though you are not able to find a routine to do it.

The *Sinclair User* team has also experienced those difficulties and we have decided to share with you a collection of 50 programming hints and tips written with reference to the letters which we receive by the sackful every week.

It is difficult to cover all the areas which make up the world of programming but we have tried to concentrate on the main aspects of writing in the Basic language. Areas covered include graphics, sound, number base conversion, using joysticks with your own programs and efficient use of memory.

Nearly all the tips include programs or short routines which illustrate the points given, or contain step by step instructions on how each technique can be applied.

The booklet is aimed at those people who want to become more experienced in the art of programming. It is also, we hope, something which will spur those who have not tried to write their own programs to do so.

1 STRUCTURED PROGRAMMING

Structure is one of the all-time great snob words of programming. People with expensive machines frequently deride the Spectrum because Basic 'cannot support structured programming'. Structured programming is a concept, and the principles can be used on any machine.

The idea to keep in mind is that of breaking down your program into a number of short blocks, preferably subroutines. For instance, an arcade game might have the following blocks:

1000 set up the screen and variables.
2000 joystick/keyboard input.
3000 result of move
4000 end of game
5000 set up user defined graphics.

The rest of the program is then a simple matter of linking the routines together:

```
10 GOSUB 5000: GOSUB 1000
20 GOSUB 2000
30 GOSUB 3000
40 If the game is over THEN GOSUB 4000
50 GO TO 20
```

Such a structure makes it much more easy to alter a program, or add extra features. You simply write another subroutine and adjust the section at the beginning which controls which subroutines are used and when.

2 GOOD HABITS

Always try to use names for variables which indicate the purpose of the variable. Variables such as 'hor' and 'ver' for horizontal and vertical co-ordinates are easier to follow than using 'x1' and 'x2' which are meaningless. Basic was designed to follow English wherever possible, so there is every precedent for keeping the tradition.

Do not be misled into using single letter variables to save space. If you are writing a program so long that space is important, you will need names which are easy to understand. You can always turn the variables into simple one- or two-character names at the end if it is necessary.

Use plenty of REM statements to remind you what a block of program does. You may know all about it at the time you write it, but it is very easy to forget after a week away from the machine.

3 USER DEFINED FUNCTIONS

User defined functions are a gift to programmers, but few use them, perhaps because they are put off by the apparent complexity of the syntax.

Think of them as miniature subroutines, which do not need to be referenced by a line number, and you will appreciate their power.

The important thing to get right is the number of variables the function will use. When you define the function you write a general instruction with variables in it. When you use it you write the precise variables or numbers you want to use in the order in which they occur in the definition.

Here is a simple example using no variables at all. It simulates throwing a six-sided die.

```
DEF FN a() = INT(RND*6 + 1)
```

Later in the program the instruction LET X = FN a() will put a number from 1 to 6 into X.

Here is an example using variables. It adds two strings together with a space between them.

```
DEF FN a$(X$,Y$) = X$ + " " + Y$
```

Later in the program, you might have the following routine:

```
100 INPUT "First name ?"; C$
110 INPUT "Second name ?"; D$
120 LET N$ = FN a$ (C$,D$)
```

You could enter "John" and then "Smith". The function would combine the two to read "John Smith".

If you are writing a program using a lot of complex manipulation of numbers or text, you may well find it saves much space and trauma to use pre-defined functions.

4 INFINITE SCROLL

It can be very frustrating, especially during a game, if the program keeps stopping and asking if you want to scroll the screen upwards.

Screen scrolling is controlled by one of the system variables, which counts the number of screen scrolls the computer will perform before it stops and asks you to press a key.

The line 10 POKE 23692, 255 will disable the feature for 254 screens. If you want to make sure that you never have to press a key to scroll, then simply make sure that line is repeated every so often during the course of the program, by incorporating it into a loop, for instance.



5 UDG STORAGE

User defined graphics characters, or UDGs, are stored in a special part of memory which starts at address 32600. Each character is stored as eight consecutive bytes made up of eight bits each, of which each represent one pixel, or dot, on the screen.

When displayed on the screen the eight bytes form a grid. Using standard UDGs there is only enough memory for the letters A to U. Those are set up in RAM and can be changed by using instructions structured around the general formula POKE USR "graphics character" + byte number (1 to 8). For instance, the seventh byte of the letter A would be entered using the instruction:

```
POKE USR "A" + 7
```

As the UDG area of memory is protected the graphics set up within it cannot be destroyed unintentionally unless you pull the plug. Not even NEW or CLEAR will do it.

6 DEFINING UDGs

To design and set up a UDG character within a Basic program you need to plan the shape of the figure on a grid. Ink in the relevant squares to make up your character with a black or blue pen. Then take each horizontal line in turn and by it write the number sum of the line. That number is constructed by working from the left to right. For each square that is linked in write a '1' and for every empty square put a zero. For instance, in a square with line one being white, white, black, white, white, black, black, white, white.

When you have all eight numbers corresponding to the lines of the grid LOAD the binary/decimal converter which can be found elsewhere in the booklet. Type each of the binary numbers in, starting from the top of the grid and note the decimal values which the conversion program returns. At the end you should have eight decimal values. Those can be put straight into a data statement in the utility program below (line 50).

```
10 FOR K 0 TO 7
20 READ A : POKE USR "A" + K, A
30 NEXT K
40 PRINT "CHARACTER STORED"
50 DATA 0, 0, 0, 0, 0, 0, 0, 0
```

Line 10 of the program sets up a loop which will go round eight times reading the decimal values of the DATA statement into the UDG area of memory. Line 20 does the reading and POKEs, or puts, those values into the UDG area. The character between quotes in line 20 is the graphics character which you want to change to the new representation.

Line 30 completes the loop and line 40 tells the programmer that the set up procedure for that particular graphic has finished. Line 50 contains the decimal values which you obtained from the binary/decimal converter and in turn from the graphics character grid.

7 USING UDGs

Once set up, a UDG can be used in two ways within a Basic program. The first way is to enclose it within a normal PRINT statement in quotation marks. When you have typed up to the point where you want to put the graphic character into a PRINT statement go into graphics mode by holding down the CAPS SHIFT key while you press the GRAPHICS key on the top row of the keyboard. Then type the key which will print the letter of the aphabet which you are using for the UDG — 'A', for instance.

When you press the key you should get a capital 'A' because the new representation is not set up until your program is run. Once you press the RUN key and then break after setting up is complete, you should see that the graphics capitals in the listing have changed to the spaceships, rockets or aliens which you created using the character generator routine.

The other way to display UDGs is simpler but you have to use the command CHR and the code number of the graphic which you want to appear. Those codes can be found on page 183 of your Spectrum manual. For instance, the code for the graphic 'A' is 144. To display that character all you have to do is type:

```
PRINT CHR$ (144)
```

8 ANTI-PIRACY

Software piracy is a scourge which is not easily eliminated. Most professional software companies incorporate anti-piracy devices within programs so that they cannot be broken into and copied, or the code in which they are written listed.

Security has always been a problem with Basic programs as listings are easily accessible even when auto-run. There is only one simple way to combat the problem without resorting to machine code and that is to close off the avenue through which pirates can enter.

To get into a Basic program which is running, the Break key is used and an error message is printed at the bottom of the screen. The screen is made up of two parts — the lower half having access to a stream of information called #0. To stop a break-in CLOSE down the stream. If information, such as an error message, tries to access it an error occurs and the system crashes.

In order to gain benefit from that knowledge all you have to do is make line 1 of any program you wish to protect:

```
1 CLOSE # 0
```

9 SOUND EFFECTS

There is no doubt that sound is not the Spectrum's finest feature. It is very difficult to write anything remotely musical; you only have to listen to the hideous tunes produced by progressional programmers to realise that.

It is possible, however, to do rather more than a few simple BEEPs at the beginning and end of the program. Experimentation is the key, but here are a few simple ideas to try out.

If your program requires single key input — for example, in choosing items from the menu — why not alter the length of the click made by the keyboard? You can do that by the instruction POKE 23609, x where x is the length of the click. Use any number from 0 to 255 until you find one you like.

Sirens are fairly easy. The secret is to slide from one note to another with very short BEEPs and then back again. Here is a short siren routine:

```
10 FOR X = 0 TO 10 STEP .5
20 BEEP .02,X
30 NEXT X
40 FOR X = 10 TO 0 STEP – .5
50 BEEP .02,X
60 NEXT X
```

The smaller the value after STEP, and the smaller the duration of each note, the smoother the sound.

The really revolting sounds, however, are produced by mixing two BEEPs together. The Spectrum has no facility for doing that, but you can alternate two sounds fast enough to create a nauseating tremolo which can form the basis of a variety of noises from screeches to explosions.

Here is one such piece of aural violence.

```
10 FOR X = – 10 TO 10 STEP 2
20 FOR Y = 1 TO 4
30 BEEP .02,.5
40 BEEP .02,X
50 NEXT Y
60 NEXT X
```

Because the two sounds are, on their own, very short, there needs to be a loop to repeat them a sufficient number of times for the noise to register in all its glory.

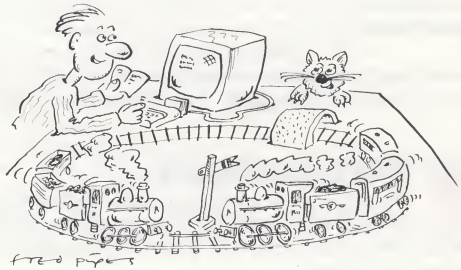
10 NOVEL CRASHES

Crashing, or bombing out, a Spectrum has become a spectators sport and many users have become fascinated, if not irritated, by the ways in which a Spectrum goes to pieces.

If you want to do it simply and deliberately one of the best ways is to type:

```
PRINT USR 1000
```

The machine should give off a buzz, the keyboard will become in-



operable and a black border will appear on the screen. If you want to show how clever you are print SINCLAIR USER IS THE GREATEST on a Spectrum at a show or in a shop and then do your PRINT USR. The rest cannot be cleared without pulling the plug.

If you want something a little more colourful, but which does not give an irretrievable crash, then type:

RAND USR 5050

A multi-coloured rectangle will appear on the screen followed by the Sinclair logo effectively resetting the machine.

Finally, if you have an EPSON FX-80 printer attached try:

RAND USR 600

11 ROM BORDER

It is possible to change the colours output to the border with a simple call to the Spectrum ROM.

The call is made to the operating system and the effect which you will get is similar to that obtained when SAVEing a computer program. First the blue and red bands, marking the header of the SAVEd program are shown and then the thinner blue and yellow bands of SAVEing. As no header information is available you will find that only one thick header signal is given.

The command is:

RAND USR 1221

and the effect can be used in games to add effects during fight sequences or to show off a title page.

12 OUT BORDER

The colour of the screen border can also be changed using the OUT instruction which sends out a specified signal to a peripheral or device which is usually clipped onto the end of the buffer at the back of the machine.

It can also affect the screen on which its signals are represented as colours. In order to make use of the border in this way it is necessary to develop a short loop routine such as the one below.

```
10 FOR K = 1 TO 100
20 PAUSE 5
30 OUT 254, K
40 NEXT K
```

Try the routine and you will find that colours flash on and off the border. If you make the PAUSE number greater the colours will run through a slower sequence. A smaller PAUSE number, except of course zero, will speed up the colour cycle.

The advantage of using the routine rather than a ROM call is that you have more control over the timing of the effect.

13 FOOLPROOF INPUTS

Writing the perfect program is not much use if imperfect human beings are capable of crashing it. When users are called upon to enter instructions it is normal to use the INPUT command, but that can cause problems. Efficient programmers ensure that even if the user makes a mistake the program will not crash.

The best thing to do is use INKEY$ wherever possible. That can only be done simply with single characters as input, but it does prevent problems with incorrect input.

The line 10 INPUT X$ will fail if the inverted commas at the bottom of the screen are deleted accidentally. Replace with:

```
10 LET X$ = INKEY$
20 IF X$ = "" THEN GO TO 10
```

Line 20 is necessary to make sure that the program will not continue unless a key is pressed.

But what if a number is required and not just any old character? Just add the line: 30 IF ((CODE X$) ◄ 48) OR ((CODE X$) ► 57) THEN GO TO 10.

That will check that a number key has been pressed by examining the code of the character in question.

If you are using a menu the above method is by far the best, and as long as the relevant options are indicated by a consecutive block of letters or numbers the limits for the codes can be changed as appropriate.

If the program requires more than one character to be entered at a time, the INKEY$ routine could be made a subroutine and each individual character checked in turn to make sure it is of the right type. In that case you will have to write some lines to store all the different key presses in a single string, and then use that for text or the VAL command to turn the string into its numerical equivalent.

That will not entirely eliminate the possibility of error. It is therefore a good idea with very important data to PRINT it up to the screen to be visually checked, with an opportunity for the user to press 'y' or 'n' — again using the INKEY$ routine for safety — to confirm the accuracy of the information.

Remember, do not just be kind to the computer, be kind to the user as well — even if it is only yourself.

14 LOW PRINT

You may have noticed that the Spectrum screen display is made up of two parts. The first and main part controls the upper three-quarters of the screen and it is here that listings and program output are displayed.

The bottom quarter, usually made up of two lines, is the part of the screen upon which commands can be typed and which the Spectrum uses to ask for INPUT during a program. Information is output to this and the other part of the screen using streams. The bottom part of the screen can be controlled using the reference number # 0. Just as you could close down the bottom part of the screen using:

CLOSE # 0

so you can print on it using a print instruction suffixed with #0. For instance PRINT # 0; "USING BOTTOM SCREEN" would put the message between the quote marks at the bottom of the screen.

Other commands can also be prefixed with # 0. These include PAPER, INK and CLS.

15 EXPLOSIONS

There are several ways in which explosions can be created on the screen. The simplest is make the main part of the screen flash with colour in a loop using a routine such as that below.

```
10 FOR K = 1 TO 50
20 FOR M = 1 TO 9
30 PAPER M : CLS: PAUSE 1
40 NEXT M
50 NEXT K
```

Unfortunately you will have to redraw whatever was on the screen before the effect when it has finished as CLS has been used.

Alternatively, you could flash the border using the ROM routine or loop described in the sections on border colour change elsewhere in the booklet. There is also another ROM routine which adds an extra dimension and that is:

RAND USR 1300

It is a cross between a quick SAVE signal and a colour.



16 PUTTING IN ZERO

You may have seen some programs which start with a line numbered 0. That is a device used to protect programs against piracy. If a copyright statement is put into a line 0, it is difficult to remove unless you know something about how programs are stored in memory.

To create your own line 0, you must first write an ordinary line such as:

1 REM PIRATES WILL BE PROSECUTED

Now you must find the beginning of the program area of memory, which is given by PRINT PEEK 23635 + 256*PEEK 23636. The number printed will be the address of the start of the program.

The first two bytes of any line in a program contain the line number, so if you POKE those two bytes with 0 your line 1 will turn into a line 0 which cannot be deleted or edited in the normal way.

Thus, if the start address was 23755 you would enter: POKE 23755,0:POKE 23756,0 and the job would be done.

17 REMOVING ZERO

To remove a line 0 you must reverse the procedure outlined in hint 16. Again, find the start of the program area with PRINT PEEK 23635 + 256*PEEK 23636.

Now you must POKE the relevant line number into the two bytes at the beginning of the program.

Those bytes act as a pair, so that numbers bigger than 255, the limit for any one byte, can be held. If you are familiar with Z80 machine code at all, you might expect the two bytes to hold the number back to front, with the 'least significant byte' first, like writing 12 as 21. But that odd convention is not used for line numbers on the Spectrum.

Because you can hold up to 255 in the second byte, the first byte stands for 256es. To find out how your line number should be POKEd in, divide it by 256 and note the remainder. Then POKE the answer to the division into the first byte, and the remainder into the second byte.

For example, if the start address was 23755 and the desired line number was 1, you would enter: POKE 23755,0:POKE 23756:1. If you wanted to have a line number 4368, you would enter: POKE 23755,17:POKE 23756,16 because 256 times 17 equals 4352, plus 16 equals 4368.

Remember always to use a line number which does not exist elsewhere in the program, or you may get into trouble.

If you wish to remove a line 0 from a commercial program, in order to rewrite it or hack into it for your own purposes, that is legal. But if it is your intention to remove the line in order to copy the program in some way or pass it off as your own work, that is illegal and may even result in criminal proceedings. So be warned — you may think piracy sounds romantic but in reality it is just another name for thieving.

18 RENUMBER

A renumber routine is very useful for serious programming in Basic. Often the line numbers get so crowded there is simply no room to squeeze in any more statements. The renumber routine below asks for the new start number and the step for each new line, in other words increasing the numbers in ones, fives or 100s as desired.

It works by POKEing the two bytes which carry the line number with a new number and then searching for the next line number. It will stop at 9900 rather than change its own line numbers, which would be disastrous.

One thing it does not do is to renumber GO TO or GOSUB statements. That would require a much more complicated routine and take far longer in Basic. You will have to make a note of those yourself; REM statements are always helpful in identifying the beginning of a new program section.

```
9900 LET START = PEEK 23635 + 256*(PEEK 23636)
9905 PRINT "ENTER SIZE OF STEP": INPUT STEP
9910 PRINT "ENTER FIRST NUMBER": INPUT NUM
```

```
9915 IF ((PEEK(START + 1) + 256*(PEEK START))► = 8999 THEN
STOP
9920 POKE START,INT (NUM/256):POKE START + 1, NUM-INT
((NUM/256)*256)
9925 LET START = START + PEEK
(START + 2) + PEEK(START + 3)*256 + 4
9930 LET NUM = STEP + NUM
9935 GO TO 9915
```

19 WHICH MODEL?

Sinclair Research has so far brought out four versions of the Spectrum. You may not think that matters as all the models are bound to be the same.

Unfortunately there are some differences and it helps to know which model you have in case special instructions are given in hardware manuals and the explanations of some Basic listings provided in magazines.

To find out your model, be it 16K or 48K, type in:

```
10 PRINT IN 57342
```

There are several numeric answers to this request for information to be printed on the screen. If you own an issue one or two you should get the number 255. Issue three owners should get the number 191. That is not a hard and fast rule, however. Some users may get 161. That should not happen but if it does your machine is probably an issue three. They do say that nothing in the Sinclair world is certain.

20 48K TO 16K

If you own a 48K Spectrum there may be times when you want it to behave in a fashion similar to the 16K model.

The main reason is usually that you want to write a program for a 16K machine but cannot tell when you overstep the memory boundary on the 48K model. The other reason is that you want to see if a professional game or a program listing from a magazine will work on a 16K as your friend or relative is unlucky enough to own one.

The method of performing the change is slightly complicated to explain but the use of it simple. Just type:

```
CLEAR 32600
```

The Spectrum will then only accept 16K programs. The reason is that the CLEAR instruction moves a barrier in memory about. If you type the instruction on its own that barrier will move to a pre-defined place within the RAM giving you access to the maximum amount of memory available.

If you move the barrier down the amount of memory available shrinks as more and more RAM is left in its wake. Moving it to address 32600 gives access to approximately 16K of memory.

21 MEMORY REMAINING

To discover how much memory is left, you must find out where the free space in RAM begins, after taking account of the length of your program, and the amount of space eaten up by variables. A short program which uses an array of dimensions (20,20,10) will take up an enormous chunk of memory for the array.

The Spectrum memory is arranged so that the area for variables and calculations is after the area holding the program. That location will inevitably vary with the length of the program. It is therefore given a system variable called STKEND which contains the address of the location. Another system variable, RAMTOP, gives the address of the last byte of RAM available in Basic; there may be memory available above RAMTOP, but that will either be occupied by information about user-defined graphics or machine code which you have stored there yourself by deliberately changing RAMTOP, so you should already know how long that area is if you intend to use it.

The appropriate instructions to read those addresses and subtract one from the other are as follows:

```
10 LET STK = PEEK 23653 + 256*(PEEK 23654)
20 LET RMT = PEEK 23730 + 256*(PEEK 23731)
```

```
30 LET MEM = RMT – STK
40 PRINT "MEMORY REMAINING = "; MEM;" BYTES"
```

22 PROGRAM LENGTH

To find the length of a program written in Basic, it is necessary to discover the addresses of the beginning and end of the section in RAM which holds it.

Luckily, the computer knows those addresses or it would not be able to find the program itself. The beginning is indicated by a system variable, START. The end is indicated by another such variable, VARS, which is in fact the start of the variables area, which is space reserved for the variables set up by the program. That area is located directly after the program itself.

The following instructions will print the number of bytes occupied by the Basic program, by PEEKing the contents of both system variables and subtracting the one from the other.

```
10 LET PRG = PEEK 23635 + 256*(PEEK 23636)
20 LET VRS = PEEK 23627 + 256*(PEEK 23628)
30 LET LEN = VRS – PRG
40 PRINT "PROGRAM IS ";LEN;" BYTES LONG"
```

Remember that the length of the program is not the same thing as the space used when the program is running and all the variables have been set up.

23 MONETARY FORMAT

Many business programs require some form of monetary input showing figures in pounds and pence. Unfortunately some business users are not as adept at figures as they should be and press extra keys giving the computer ridiculous numbers. You would look silly if your balance book showed a total of £50.03233.

The program below will look at each input number and chop off any extra figures entered. It will also give the number a pound sign as a prefix.

```
10 INPUT A
20 LET A$ = STR$(A)
30 FOR K = 1 TO LEN A$
40 IF A$(K TO K) = "." THEN LET B = K
50 NEXT K
60 LET B$ = A$(B TO )
70 LET B$ = B$(1 TO 3)
80 LET A$(1 TO B – 1) + B$
90 PRINT VAL(A$)
```

Use the routine as a subroutine in one of your programs and any value input to variable 'A' will be formatted.

24 JOYSTICK COMPATIBLE

Using a joystick to control action within one of your own Basic programs may seem difficult but nothing could be easier. It is only the Kempston 'standard' with which you may have difficulty.

Most of the other interfaces use the character codes generated by the cursor keys. For instance, if you pushed the joystick to the left the Spectrum would register the code 08.

The Kempston interface is not so simple to use. To read it you can use the program routine below.

```
10 LET JOY = IN 30
20 IF JOY = 3 THEN PRINT "UP"
30 IF JOY = 4 THEN PRINT "DOWN"
40 IF JOY = 1 THEN PRINT "RIGHT"
50 IF JOY = 2 THEN PRINT "LEFT"
60 GOTO 10
```

As soon as you push the joystick in a new direction the IF...THEN statements will check the direction in which the change has been made. You can, of course, turn the program into a subroutine and put your own actions after THEN. If you want the "fire" option active within your game you will have to add an extra line to the program.

```
55 IF JOY = 16 THEN PRINT "BANG"
```

25 COLOUR CODES

There are two ways to use colour on the Spectrum. One is to write INK and PAPER statements to set the colours you want, the other is to use control codes.

The colour control codes are the easiest to use because the keys you use have the colours written over them.

To use a colour control code, go into Extended Mode — CAPS SHIFT and SYMBOL SHIFT —. Then hold down CAPS SHIFT and press the key with the appropriate colour. The cursor will change colour, and any character typed will now be in the appropriate colour.

If you delete the line, you will find the cursor deletes a hitherto unseen question-mark at the point where the colour was changed. That is the control code, invisible in the program listing but stored in the computer memory all the same.

You must remember to use another colour code at the end of the colour section to return to the original colour, usually black ink on white paper.

The colour code only affects the ink colour. If you want to change the paper colour you could either use PAPER or perhaps an additional code for Inverse Video, thus swapping the paper and ink colours around. You can write several codes in a row to get the required effect.

The Spectrum should usually handle control codes perfectly, but sometimes produces the 'dreaded buzz' at which point the computer issues a low growl and refuses to accept any input, including delete.

To deal with the buzz, just EDIT a line down from the main program to wipe out the current line and start again.

The precise causes of the buzz are beyond the scope of this booklet. Think of it as one of those idiosyncratic Clivebugs which we must all learn to love.

26 CHARACTER CODES

Character control codes can be used in place of functions such as SPACE, ENTER, CAPS LOCK and can also be used to print characters on the screen.

If you want to print a character without having all the bother of enclosing them within quotation marks you can use the principal control code instruction which is CHR$. For instance if you wanted to type the message "HELLO" on the screen you could either print: PRINT "HELLO" or you could use the command

PRINT CHR$(72) + CHR$(69) + CHR$(76) + CHR$(76) + CHR$(79)

Those codes can be found on page 183 of the Spectrum manual and each letter is put in a separate CHR$ statement. The '+' operator adds one character to another so that they appear on one line together. You could force a new line just by putting the control code in between the letters. The code for ENTER is 13 so the line

PRINT CHR$(65) + CHR$(13) + CHR$(66)

will produce 'A' followed by 'B' on the next line.

27 INVERSE VIDEO

Using inverse video is as easy as using the colour codes, but people get confused because there are several ways of doing it, notably two INVERSE keys.

The one at the bottom of the keyboard (E-mode key M) is a command just like PAPER and INK. You follow it with a 1 for Inverse and a 0 to cancel the command.

Key 4 has Inverse Video printed above it, and in conjunction with CAPS SHIFT produces the control code which will turn any further characters into inverse form.

Key 3 is the control code to reverse the operation. Remember that, unlike the colour control codes, you do not go into Extended Mode to get the codes. Just hold down CAPS SHIFT.

One set of codes Sir Clive did not print on the keyboard are those for making the characters flash. They can be found by going into Extended Mode, holding down CAPS SHIFT, and pressing keys 8 and 9. Key 9 turns the flash on and key 8 turns it off.

To make matters even more complicated, a completely different

method is used to obtain the inverse of the block graphics on keys 1 to 8. To get those, all you need to do is hold down CAPS SHIFT while in graphics mode.

When the ZX-81 was produced it had all the block graphics possible each on its own key. But there were so many extra functions to include on the Spectrum that the set got chopped in half, with one half the inverse of the other half.

The change is an excellent example of what computer manufacturers call 'enhancement', usually a new way of doing things which makes life twice as difficult for the user.

28 SOFT-RESET

When programming in Basic it is annoying to have to pull the plug every time you want to remove some user defined graphics quickly from the graphics area of memory or nullify the effects of a program so that the system is reset.

It is possible, however, to reset the system:

RAND USR 0

When you type the command in and execute it by pressing ENTER the screen should display a large black rectangle which, after a few seconds will disappear to be replaced by the Sinclair logo.

The explanation is simple. Typing RAND USR will invoke machine code at a specified address. The number, zero, after the command sets the Spectrum running at address 0000 which is the start of the Basic interpreter and operating system.

29 SHORTHAND LOGIC

Although Basic was designed to be as like English as possible, the logic operations : AND, OR, =, ◄ and so on are often confusing unless used in very simple forms. In fact, used properly, they can increase the speed of a program.

In Sinclair Basic, the expression IF A = B THEN GO TO 100 has an obvious meaning. However, the computer works the meaning out in a rather odd way. The expression A = B is treated as a number, just like SIN X has a numerical value. The value of A = B will be 1 if true and 0 if false. The same applies to other operations.

That allows you to rewrite complicated IF statements in a shorthand logic which relies on the numerical values.

Take the line: 10 IF A = B THEN LET X = X – 1. That could also be written as follows: 10 LET X = X – (A = B). If A does not equal B then X does not change. If it does then 1, the value of A = B, is subtracted from X.

There will be already a small saving in speed but because IF is no longer used a number of similar conditions can be added together.

10 IF A = B THEN LET X = X + 1
20 IF A ► B THEN LET X = X – 1
30 IF A ◄ B THEN LET X = X + 7

can be written:

10 LET X = X + (A = B) – (A ► B) + (A ◄ B)*7

Good programmers may use a dozen or more such conditions in a single line to save both time and space.

The concept can be expanded using the following further facts: (A OR B) is 1 if either A or B is not equal to zero. IF A THEN LET X = X + 1 means exactly the same as IF A ◄► 0 THEN LET X = X + 1. (A AND B) has the value of A if B is not equal to zero. (NOT A) is 0 if A is not zero. The full list can be found on page 64 of the original Spectrum manual.

Logic operations are not easy to follow without practice, but when mastered you will find your programs are far more efficient and less likely to carry mistakes than if you use dozens of IF statements.

30 BETTER DRAW

Drawing line figures on the screen is irritating because it usually means that you have to write lines containing long lists of co-ordinates mixed up with DRAW and POINT commands.

A simple way around that is to write a subroutine consisting of one DRAW command. Then set up your co-ordinates in an array and feed them through two simple variables called x and y. In that way you will be better able to keep track of what you draw on the screen. The routine will look something like the program outlined below.

```
10 DIM A(6): REM EVEN NUMBERED ARRAY FOR CO-ORDINATES
20 SET UP...
30 AS MANY...
40 VARIABLES...
50 AS YOU NEED...
60 LET X = NEW X CO-ORD
70 LET Y = NEW Y CO-ORD
80 GOSUB DRAW
90 REM SUBROUTINE DRAW
100 DRAW x,y
110 RETURN
```

Take the above outline as your guide and you will find writing graphics routines easier.

31 NUMERIC SORT

Sorting information into ascending numeric order is something with which business people are familiar. The program below is a simple sort routine. It takes numbers from one array and transfers them in order of ascendancy into another.

```
10 LET N = 0
20 DIM A(5)
30 FOR K = 1 TO 5
40 INPUT A(K)
50 NEXT K
60 LET B = A(1)
70 DIM C(5)
80 FOR M = 1 TO 5
90 FOR K = 1 TO 5
100 IF A(K) B THEN LET B = K: LET D = K
110 NEXT K
120 LET C(N) = A(D)
130 LET N = N + 1
140 LET AD = 9999
150 FOR K = 1 TO 5
160 PRINT C(K)
170 NEXT K
```

32 SORTING CHARACTERS

Sorting characters into alphabetic order is no more difficult than sorting numbers. The only problem is that you have to find the numeric value of each character using the CODE instruction.

In the alphabet the letter A comes before the letter B. Unfortunately the computer has no such knowledge but as each character has a number representation you can compare the values of characters using the IF...THEN statement.

The simplest way to sort a string of characters, making sure that they are all capital letters, is to dimension three variables. The first is empty but will hold the result, the second holds the string to be sorted and the third is the letter under consideration or the last lowest value character.

Look at the first character in the string and store its value. Then look at the second character. If the value of the second character is lower than that of the first then put that value into the variable, replacing the first one. Then go to the next character on the string and compare it with the last value.

When you get to the end of the string the first time around put the character whose value is in the variable into the empty string. Then check to see if the two strings are of the same length. If they are not then the sort has not been finished and a further round of comparisons must take place.

After the first round of comparisons has been made, however, a new variable must be defined. That contains the value of the last letter put into the string which you are building out of nothing. Then every comparison must satisfy two conditions. Is the value lower than the preceeding one and is it higher than the last letter entered into the string which is being built? If the answer is yes to both conditions then the value replaces the old lowest value and the comparison continues. Comparisons will continue to be made until the two strings are equal, that is, they have the same number of characters in each, the latter being sorted into alphabetic order.

33 AUTO CAPS LOCK

When you are writing a program which needs to recognise pieces of text entered via the keyboard by the user, the last thing you want to do is check every input to see if the CAPS LOCK is on or lower case letters are being used.

The best way to avoid that is to put the CAPS LOCK on automatically within the program before asking for information.

POKE 23617, 8

The address used, 23617, tells the computer which cursor mode it is in. K means command, L means line and C means Capital letters. The above command will give you a 'C' cursor and typing INPUT will provide you with capitals. Type in the program below and you will see for yourself.

```
10 POKE 23617, 8
20 INPUT A$
30 PRINT A$
40 GOTO 10
```

34 BINARY/DECIMAL

The following program converts Binary numbers into decimal. You may find it useful for working out the correct decimal numbers for UDGs — see tip 6 — as well as other uses.

```
10 REM BINARY TO DECIMAL
15 LET DEC = 0
20 PRINT "ENTER BINARY NUMBER"
30 INPUT A$
40 LET X = LEN A$
50 FOR N = X TO 1 STEP -1
60 LET DEC = DEC + VAL(A$(N))*2I(X - N)
70 NEXT N
80 PRINT "DECIMAL VALUE OF";A$;":" ' ';DEC
90 STOP
```

35 DECIMAL/BINARY

The following program will convert decimal numbers into binary.

```
10 REM DECIMAL TO BINARY
20 PRINT "ENTER DECIMAL NUMBER"
30 INPUT X : LET DEC = X
40 LET A$ = ""
50 IF INT(DEC/2) = (DEC/2) THEN GO TO 100
60 LET A$ = "1" + A$
70 LET DEC = DEC - 1
80 IF DEC = 0 THEN GO TO 150
90 GO TO 110
100 LET A$ = "0" + A$
110 LET DEC = DEC/2
120 GO TO 50
150 PRINT "BINARY FOR ";X;" IS:" ' ';A$
160 STOP
```

36 HEX TO DECIMAL

It is often necessary to convert a hexadecimal value into denary, or base 10, in order to poke those values straight into memory. As you may realise most magazines list machine code pro-

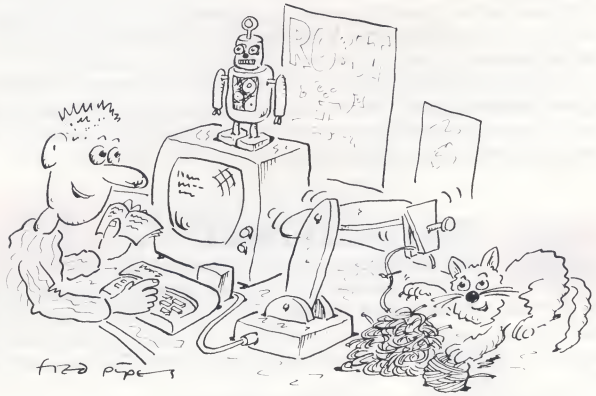
grams in hexadecimal code. The program below will convert hex to denary.

```
10 LET SUB = 1: LET DEC = 0
20 INPUT"HEX"; HEX$
30 LET N$ = HEX$ (LENS HEX$)
40 LETHEX$ = HEX$ (1 TO (LENS HEX$ – 1)
50 GOTO 120:
60 IF LEN HEX$►0 THEN GOTO 30
70 PRINT"DENARY";DEC
110 STOP
120 LET F = CODE N$
130 IF F ◄ 57 THEN LET L = F – 48
140 IF F ◄ 65 THEN LET L = F – 55
150 IFXF ◄ 97 THEN LET L = F – 87
160 LET DEC = DEC + L*SUB
170 GOTO 60
```

37 DECIMAL TO HEX

As many monitor programs display machine code in the hexadecimal number notation, where one to nine is followed by A to F, representing the numbers 10 to 15, a conversion program for decimal to hexadecimal is required. In the program below all you have to do is type in the denary, base 10 number, and it is automatically converted to hexidecimal, base 16.

```
10 INPUT "DENARY:"; DEN
20 LET BAS = 4096
30 LET HEX$ = ""
40 LET SUB = INT(DEN/BASE)
50 GOTO 130
60 LET DEN = DEN – SUB* BASE
70 LET BASE = INT(BASE/16)
80 IF BASE◄1 THEN GOTO
90 GOTO 70
100 FOR K = 1 TO 3: IF HEX$ (1) = "0" THEN LET HEX$ = HEX$(2
TO): NEXT K
110 PRINT "HEXADECIMAL:"; HEX$
120 STOP
130 IF SUB◄ = 9 THEN LET HEX$ = HEX$ + CHR$ (SUB + 48)
140 IF SUB►9 THEN LET HEX$ = HEX$ + CHR$ (SUB + 55)
150 GOTO 50
```



38 STRING SEARCHING

To search for a string within another string you will need two string variables. The first contains the string upon which the search is to take place and the second contains the string for which we are searching. The program below demonstrates the procedure.

```
10 INPUT "MAIN STRING"; M$
```

```
20 INPUT "SEARCH KEY"; S$
30 FOR K 1 TO LEN(M$)
40 IF K LEN(S$)► LEN(M$) THEN GOTO
50 IF S$ = M$(K TO (LENS(S$)) THEN PRINT"MATCH AT";K
60 NEXT K
```

Line 10 asks for the main string to be entered and line 20 accepts the string for which you are searching within M$. Line 30 sets up a string which will loop until all of M$ has been searched. Line 40 will make sure that M$ is long enough to cope with a search using the S$ key. If S$ was bigger than M$ an error could occur. If that is the case the comparison is skipped and the loop is executed harmlessly until it has finished.

Line 50 performs the search. It compares S$ to the part of the M$ string starting at character 1, then continues with character 2 and so on. If a match is made the placing at which it is found within M$ is printed. If no match is found no message is printed.

39 CENTRED TEXT

The following routine examines a string of text and centres it on the screen so that the left and right margins are equal. Although the routine requires you to enter a line of text, which should not contain more than 32 characters, it is best used in the form of a subroutine in part of a longer program to deal with headings and the like.

```
10 PRINT "ENTER YOUR LINE OF TEXT"
20 INPUT A$:CLS
30 LET X = LEN A$
40 LET X = INT (32 – X)/2
50 PRINT AT 0,X;A$
60 STOP
```

If you want to centre more than one line of text, change the 0 in line fifty to a variable such as Y. Then arrange to have Y increased by one each time the routine is used, so that the lines will be printed one under the other.

40 RANGING RIGHT

Sometimes, when printing text on the screen, it is desirable to have the right hand margin straight and the left hand margin ragged, the reverse of normal procedure.

The following routine takes a line of text, which must be no more than 32 characters long, and prints it to the right hand margin.

```
10 PRINT "ENTER LINE OF TEXT"
20 INPUT A$:CLS
30 LET X = 32 – LEN A$
40 PRINT AT 0,X;A$
50 STOP
```

The routine is obviously of greater use as a subroutine to be used when required. In that case you would probably want to adjust the value 0 in line 40 to indicate how far down the screen the text should be printed, by using a variable which could be altered as desired.

41 255 COLOURS

Few people realise that the Spectrum can display more than its allotted nine colours. It is a simple method which



combines UDGs and the little-used OVER instruction.

First construct two UDGs in the chessboard fashion shown in the two diagrams above. Then you are ready to print new colours. The program below will demonstrate the technique and uses the UDGs "A" and "B" which have already been set up.

```
30 PRINT AT 10,10; INK ;"A"
40 OVER 1
50 PRINT AT 10, 10; INK ;"B"
60 OVER 0
```

What you should have on the screen after running the routine is a character square containing a new colour. Experiment. By controlling the INK colour with a simple FOR...NEXT counting loop you can cycle through all the 255 colours available.

42 SLOW PRINT

To add a science fiction effect to your armoury of game programming ploys you could try the sub-routine shown below.

```
10 LET A$ = "THIS IS A MESSAGE"
20 FOR K = 1 TO LEN (A$)
30 PRINT A$(K TO K);: PAUSE 5
40 NEXT K
50 PRINT
```

You will find the printing of the message which has been put into the variable A$ is slowed down by the PAUSE in line 30. Your computer gives a display similar to those in the big science fiction movies where printing is slowed down on the screen to give a dramatic effect. Any self-respecting programmer would die rather than have a program acting as slowly in real life but a game display can be enhanced especially if you re-define the character set to produce square, futuristic, lettering.

43 TEXT SEARCH

When writing programs such as adventure games it is often convenient to have a string which contains a whole series of words end-to-end, in order to save space instead of using huge arrays. The problem is to search for a particular word in the string.

The following program does just that, using as an example a list of directions which, in the context of an adventure game, might refer to the various movement commands.

```
10 LET B$ = "NORTHSOUTHEASTWESTUPDOWN"
20 INPUT"ENTER YOUR WORD";A$:IF A$ = "" THEN GO TO 20
30 LET X + LEN B$ – LEN A$ + 1
40 LET N = 1
50 IF B$(N TO (N + LEN A$ – 1)) = A$ THEN GO TO 100
60 IF N = X THEN GO TO 200
70 LET N = N + 1:GO TO 50
100 PRINT "YOUR WORD IS IN THE LIST"
110 STOP
200 PRINT "YOUR WORD IS NOT IN THE LIST"
210 STOP
```

Of course, in a real adventure game you might also want to check the validity of the word found, to avoid the program accepting something like "UPDOW" which is in the string. That might be done by having spaces between the words, and checking the characters on each side of the word found. There might also be a set of numbers or characters after each word which the computer would use to implement the instructon: for instance, the number of a subroutine to perform the action "GO NORTH".

44 HEX LOADER

The following program will allow you to enter a block of machine code in hexadecimal form. You may input as many pairs of hexcode characters as you wish, and the letter S will stop

the program when you have finished.

The program first asks for the starting address to which the code is to be sent.

```
10 INPUT "STARTING ADDRESS";ST
20 INPUT "ENTER STRING OF HEX";A$
30 IF A$ = "" THEN GO TO 20
40 IF A$(1) = "$" THEN GO TO 130
50 LET A = CODE A$(1):LET B = CODE A$(2)
60 LET A = A - (A►64)*55 - (A◄58)*48
70 LET B = B - (B►64)*55 - (A◄58)*48
80 LET C = 16*A + B
90 POKE ST,C:LET ST = ST + 1
100 IF LEN A$ = 2 THEN GO TO 20
110 LET A$ = A$(3 To)
120 GO TO 40
130 STOP
```

Do remember to enter all the letters in the hexcode as capital letters.

45 FILL

You can draw lines and circles on the Spectrum, and it is easy to link them to form all sorts of shapes. But unfortunately there is no command you can use to colour them in.

There are several ways of filling in shapes. One is to draw a series of lines one on top of the other, instead of the outline, but that requires a formula for the shape. It is easy with rectangles or squares but more complex with curves or irregular shapes.

The following program is one solution to the problem. It examines each pixel in turn, scanning from left to right across the screen. When it finds a dot, it starts drawing a row of dots until it comes across another one. The program is slow, but it does the job; a really good fill routine would require machine-code, which is beyond the scope of this booklet.

As an example, the program starts by drawing a square

```
10 CLS
20 PLOT 165,120: DRAW 0,-81: DRAW -81,0: DRAW 0,81:
DRAW 81,0
30 LET KON = 1
40 FOR Y = 175 TO 0 STEP -1
50 FOR X = 0 TO 255
60 IF POINT(X,Y) = 1 THEN LET KON = 1 - KON
70 IF KON◄1 THEN PLOT X,Y
80 NEXT X
90 NEXT Y
```

The program is very slow. It can be improved by altering the limits of the variables x and y in lines 40 and 50. At present they cover the whole screen, but if you know the area in which the shape to be filled is located, then you could have the program scan only that narrow range.

46 CHARACTER CHANGE

User defined graphics are all very well, but there are only 21 of them. If you want more you can completely rewrite the character set. To do that you must construct your own characters, store them in memory, and then convince the Spectrum to use yours instead of those in ROM.

It is not as difficult as it sounds. Let us assume you want to alter the alphabet and numbers only, which will leave keywords and the like unchanged thus avoiding too many problems reading your program listing. It will nevertheless give you 82 possible UDGs, which should be more than enough.

The following program will do the job. Numbers underlined and in brackets are equivalents for the 16K Spectrum.

```
10 CLEAR 63999(30999)
20 FOR X = 0 TO 767
30 LET Y = PEEK(15616 + X)
40 POKE 64000(31000) + X,Y
50 NEXT X
```

The program simply transfers the existing character set to an area above RAMTOP. You are now set to alter those characters you wish to change.

Prepare your character set as if you were using user define graphics. To load them in, use the following routines:

For the numbers 0-9

```
60 FOR X=64128(31128) TO 64207(31207)
70 READ NUM
80 POKE X,NUM
90 NEXT X
100 DATA.....
```

The DATA statements contain the new design for the character as in creating UDGs, i.e. a series of eight numbers for each character, either as decimal numbers or binary numbers using BIN. For capital letters change line 60 to

For X=64264(31264) TO 64471(31471).

For lower case letters change line 60 to

FOR X=64520(31520) TO 64727(31727)

If you want to change the entire set, use the values for X given in the first program in line 60 of the second.

Having completed the hard work, you are now set to fool the computer into preferring your set over its own. When the computer wants to print a character, it looks at a system variable called CHARS, which contains the address in ROM of the character set. You can change that address to make it refer to your own set.

The following instructions make the appropriate change:

```
10 POKE 23606,0(24)
20 POKE 23607,249(12)
```

You will of course want to save the new character set and load it in to one of your programs later. Save it using SAVE "name" CODE 64000(31000),768 and LOAD it in using something like 10 CLEAR 63999(30999):LOAD ""CODE at the beginning of the program.

47 LIST FILES

The following program lists the names of programs on a tape and loads the one selected. It stores the names of up to ten programs, and each name can be up to ten letters long. Machine-code programs should be given a name starting with the letter "X".

```
10 REM LISTING PROGRAMS
20 DIM A$(10,10)
30 PRINT "PRESS 'L' FOR A LIST OF PROGRAMMS"''"PRESS 'N'
TO NAME PROGRAMS"
40 GOTO 50+(INKEY$="L")*50+(INKEY$="N")*100
50 GO TO 40
100 CLS
110 PRINT # 0; "SELECT A TO J TO LOAD PROGRAM"
120 FOR X=0 TO 9
130 PRINT AT X,0;CHR$(X+65),A$(X,1 TO)
140 LET B$=INKEY$
150 IF B$="" THEN GO TO 140
160 GOTO 170-(((CODE B$)◄65)OR ((CODE B$►74)))*30
170 LET NUM=(CODE B$)-64
180 CLS:PRINT "START TAPE AND PRESS ANY KEY": PAUSE 0
190 IF A$(NUM,1)="X" THEN GOTO 300
195 LOAD A$(NUM,1 TO):STOP
200 CLS
210 FOR X=0 TO 9
220 PRINT AT X,0;CHR$(X+65),A$(1 TO)
230 NEXT X
240 PRINT "" "TO CHANGE OR ADD NAME,"' "PRESS LETTER
AND ENTER NAME"
245 PRINT "PRESS $ TO STOP"
250 PRINT "START M/C NAMES WITH THE LETTER X"
260 LET B$=INKEY$: IF B$="" THEN GO TO 260
265 IF B$="$" THEN GO TO 30
270 IF (((CODE B$◄65) OR (CODE B$►75) THEN GO TO 260
280 INPUT "ENTER NAME"; C$:IF LEN C$►10 THEN GO TO 280
290 LET A$(76-CODE B$)=C$:GO TO 200
300 LOAD A$(NUM,1 TO) CODE:STOP
400 SAVE "FILE" LINE 30
```

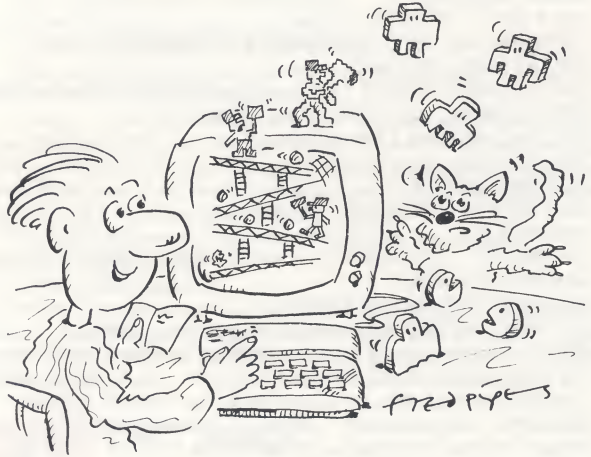
Two notes: Always write your program names in capital letters, and always save the program by typing GO TO 400..

48 ANIMATION

Animation of a character could not be simpler but it is the most effective technique which can be used on the screen.

Firstly you must design the character which you want to animate and put it in a character square. Then make it into a UDG using the techniques outlined elsewhere in this booklet.

Then, using character squares again, show the positions into which your characters can get. For instance a stick man or woman might move arms and legs up and down. Design UDGs which illustrate the final positions into which the limbs will move.



Now to the animation. Print the first character which you designed onto a position on the screen. From here you will have to make a choice. If your character is to stand still, use the sequence of movement which you have created with UDGs in the same position. As you print one, then the next and then the next, so the impression of movement will be achieved. The effect is rather like sketching many pictures of a pin man hundreds of times on different pages in an exercise book but in different poses. As the pages are flicked so the pin man appears to move.

If you want the man to move about the screen you can use the PRINT AT instruction to move him up, down or across the screen. The movement effect will be the same and the eyes will be deceived.

49 CONTROL KEYPAD

A control keypad is simply a set of keys to manipulate what is displayed on the screen, usually to move an object around such as the hero of an arcade game.

The following routine uses keys Q, A, O and P for Up, Down, Left and Right to move a character one space at a time. It also checks to ensure the character does not move off the edge of the screen. The character used is "?", and starts at co-ordinates 10,15.

```
10 REM CONTROL KEYPAD
20 LET X = 10:LET Y = 15
30 LET X = X + (INKEY$ = "P") - (INKEY$ = "O")
40 LET Y = Y - (INKEY$ = "Q") + (INKEY$ = "A")
45 GOTO 50 + (INKEY$ = "S")*50
50 LET X = X - (X►31) + (X◄0): LET Y = Y - (Y►21) + (Y◄0)
70 PRINT AT Y,X;"?"
80 GO TO 30
100 STOP
```

Lines 30 to 50 use logic operations instead of IF statements. A full explanation is given in tip 29. Line 45 makes the program stop if "S" is pressed, and go to line 50 if not.

November 1983

An independent magazine published by ECC Publications

sinclair user

Only 75p

Issue No 20

FREE BEGINNER BOOKLET

ALCHEMY ON THE SPECTRUM

TRANSFORM YOUR BASIC PROGRAMS

Micronet adaptor taken apart

Ian Logan speaks about the Microdrive

Running a school with the ZX-81

Chinese do deal with Sinclair



BIGGEST EVER ISSUE 164 fact-filled pages

THE INDUSTRY STANDARD INTERFACE

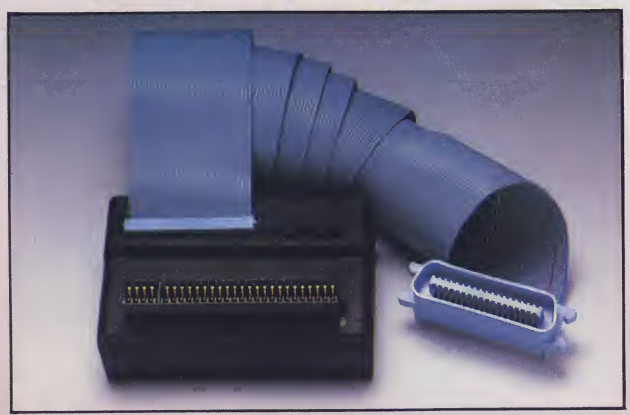
FULLY MICRODRIVE COMPATIBLE



ONLY £45.00 INCLUSIVE

At last you can have real print performance from your ZX Spectrum with the Kempston Centronics Interface. As the Interface allows you to link your ZX Spectrum to any of a vast number of printers with an industry standard centronics input, you can choose the printer that suits *your* needs – from high speed dot matrix to professional letter quality printers.

We recommend all Epsons, NEC, TEC, all Seikoshas, OKI Microline, Tandy GP115/Oric MCP 40, Star DP 510, Shinwa, etc.



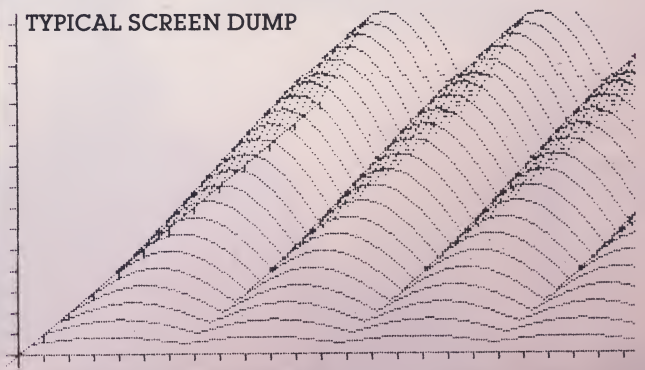
The Kempston Centronics Interface recognises the LLIST and LPRINT commands and will allow print width selection from 32 characters to full width. Word processing is now possible by using a software package such as Tasword Two (Price £13.90), available from Kempston, you can display 64 characters per line on screen which is ideally suited to A4 size paper allowing you to print letters, lists, documents etc.

Full screen dump to a high resolution printer is also possible, supporting software is supplied with the Interface for the Epson and Seikoshas range.

If your need is more than just a printer the Kempston Centronics Interface is fully compatible with the Roland DG DXY 100 X – Y Plotter. This is ideal for graphics, graphs, drawing as well as business, scientific and engineering applications, as the X – Y Plotter takes up to A3 size paper and can accommodate pens of many different colours.

The Kempston Centronics interface simply plugs into the ZX Spectrum expansion port. A one metre ribbon

TYPICAL SCREEN DUMP



cable then connects to the printer or plotter of your choice. All driving software (including high resolution dump) and full instructions are, of course provided, complete with a six months guarantee.

Available from:
Buffer Micro Shop (London)
Computerama (London)
Microshack (Aberdeen)
Clwyd Personal Computers (Clwyd)
Microware (Leicester)
or direct from:

New business software only for the Kempston Centronics Interface.

Finance Manager – Menu driven program for all domestic and business accounting applications.

Address Manager – Simple index filing system ideal for names, addresses etc. Various search facilities.

Full Screen Editor/Assembler – Allows you to write Z80 assembly code using standard mnemonics on full screen.

Only £19.95 each. For ZX Spectrum 48k, published by O.C.P.

KEMPSTON
MICRO ELECTRONICS

Unit 30, Singer Way, Woburn Road Industrial Estate,
Kempston, Bedford. Tel: Bedford (0234) 856633
Telex No: 826078 KEMPMI G

All prices include VAT and P & P.
Overseas orders please add £4.00 P & P.

TRADE ENQUIRIES WELCOME

For ZX Spectrum

Contents

sinclair user

incorporating Spectrum User

Managing editor
Nigel Clark

Deputy editor
Nicole Segre

Consultant editor
Mike Johnston

Managing production editor
Harold Mayes MBE

Software editor
John Gilbert

Program reviewer
Rebecca Ferguson

Illustrator/designer
Brian King

Group advertisement manager
John Ross

Sales executive
Annette Burrows

Production assistant
Dezi Epaminondou

Managing director
Terry Cartwright

Chairman
Richard Hease

Sinclair User is published monthly by ECC Publications Ltd.

ABC
MEMBER OF THE AUDIT BUREAU OF CIRCULATIONS

Telephone
All departments
01-359 3525

If you would like to contribute to any of the Sinclair User group of publications please send programs, articles or ideas for hardware projects to:
Sinclair User and Programs,
ECC Publications,
196-200 Balls Pond,
London N1 4AQ

Programs should be on cassette and articles should be typed. We cannot undertake to return them unless a stamped-addressed envelope is included.
We pay £10 for the copyright of each program published and £50 per 1,000 words for each article used.

© Copyright 1983
Sinclair User

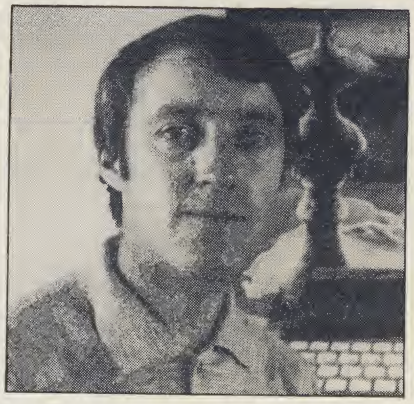
ISSN No 0262-5458

Printed and typeset by
Cradley Print PLC,
Warley,
West Midlands

Distributed by
Spotlight Magazine Distribution Ltd,
1 Benwell Road,
Holloway,
London N7
01-607 6411

Cover Photograph:
Peter Dawney





5 SINCLAIRVOYANCE Are there signs that the micro bubble may have burst?

11 SINCLAIR USER CLUB More offers and news about the biggest club for Sinclair users in the country.

17 NEWS Record profit for Sinclair Research; sales of ZX-81 to China; and much more.

19 SINCLAIR SIMON Our hero wonders about the Chinese ZX-81.

25 LETTERS We choose the best from our bumper postbag.

31 HARDWARE WORLD Modems and interfaces dominate the new add-ons.

37 SOFTWARE SCENE Our writers review the latest releases.

48 COMPILERS John Gilbert assesses the software packages which allow programmers to turn slow Basic programs into much faster listings.

56 MICRONET ADAPTOR Stephen Adams looks inside the little box which allows you to contact large databases.

62 MICRODRIVE John Gilbert speaks to Dr Ian Logan who was responsible for much of the work on the ROM of the new add-on.

71 PROGRAM PRINTOUT Sixteen pages of the best listings sent by our readers.

96 USER OF THE MONTH A Canterbury schoolmaster tells Nicole Segre how he revolutionised administration at his school.

105 FORTH John Gilbert continues his series on the alternative language, reporting on the importance of the Editor.

112 PROGRAMMING John Armfield shows how to display results from programs in the best way.

120 HELPLINE Andrew Hewson answers your problems and gives some hints on improving your programming.

123 BOOKS More technical information is being published but John Gilbert thinks that there is room for improvement.

131 STARTER PACK In our new expanded section we include an article on error-trapping techniques.

141 MIND GAMES Quentin Heath travels to the Wild West to search for gold.

148 SOFTWARE DIRECTORY This month we include our list of cassettes in full.

NEXT MONTH

Stephen Adams reviews communications systems for Sinclair machines. We meet a user who lives in Strasbourg; and there is a special introductory Christmas offer for our growing Sinclair User Club.

"IT LOOKS NICE BUT WHAT THE HELL CAN I DO WITH IT?"

Every ZX SPECTRUM Print'n'Plotter Jotter has 100 pages of finely printed screen grids.

50 for the high resolution screen. 50 for the normal character screen.

With these at your disposal you can plan practically any graphics print-out to program into your computer.

The high-resolution PLOT grid shows every one of the 45,060 pixels! Every one printed. Every one with its co-ordinate numbers. This gives you enormous graphics power to DRAW, PLOT, CIRCLE, PLOT OVER and so on in any position or screen building up graphic drawings, charts, maps . . . in fact anything without the complications of guesswork, integer out of range, or wrongly positioned pixel colours which change PRINTed INK characters!

The normal character PRINT grids on the other hand will allow you to be specific about PRINT AT, TAB, PRINT OVER, SCREEN$ and INK/PAPER in direct co-ordination with PLOT . . . you see every page is printed on **high quality tracing paper** . . . ideal to overlay on to illustrations and 'copy' or co-ordinate.

And there's another bonus, because each page contains 24 User-definable grids — **2400 per pad!**

With 50 pages of PLOT grids, 50 pages of PRINT grids 2400 user-definable grids, a set of colour pens, a printed PIXEL RULER and our Special Offer of demo programs, IT'S THE BEST VALUE IN ZX GRAPHICS PROGRAMMING.



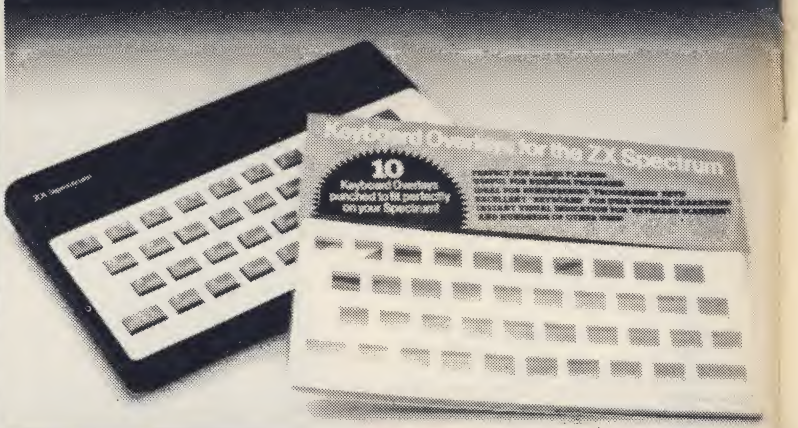
"NOW WHICH KEY DO I PRESS TO SHOOT DOWN THE THING FROM MARS?"

Ever forgotten which key to press when playing a game?
Do you suffer from a mind-boggling mass of programmed keys?
Do you write programs that use different keys to perform various functions? If so, we have just the thing for your ZX SPECTRUM.

A pack of Print'n'Plotter Keyboard Overlays.

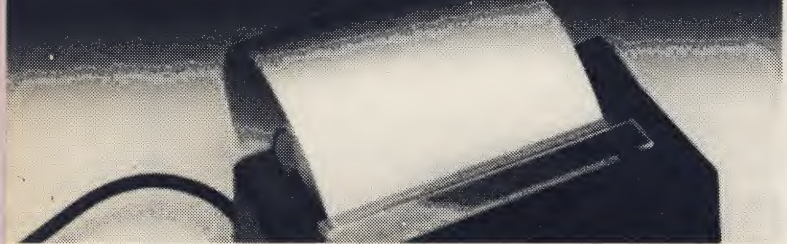
Just write the function or functions under each key you program and keep the overlay for the next time you play the game.
Of course there's lots of more uses you will find for our OVERLAYS, user defined characters, keyboard scanners, mathematical programs, business uses — to name just a few.

There's TEN OVERLAYS to a pack — so you can program with impunity! And they fit perfectly onto your standard ZX SPECTRUM KEYBOARD. Each OVERLAY is printed with the cursor movement key directions and there's room for program name etc.



"PRINTER PAPER THAT WORKS? I DON'T BELIEVE IT!"

Five rolls of our PRINTER PAPER will only cost you £12.50 including postage, packing and VAT! And you'll gain a great deal more!
It prints beautifully. It's not too thick. It's not too shiny. Print is black — not grey. It actually feeds through the machine!
See for yourself only £12.50 including everything. It's a bargain!



A SPECTRUM CONSOLE THAT EVERYONE CAN AFFORD!

For the cost of a 'games' cassette you can have a truly professional console for your SPECTRUM!

We've cut costs (not cut quality) by designing a self-assembly method using relatively inexpensive materials like strong corrugated board.

The result is a console that's tough, light, highly finished and capable of giving years of useful service.

Facilities include ergonomic keyboard angle, access to rear of machine, choice of P.S.U. internal or external, and alternative of Printer on-board or cassette storage area. Fully illustrated instructions are included.



Post today to Print 'n' Plotter Products, 19 Borough High Street, London SE1 9SE or phone: 01-403 6644 (General) or 660 7231 (Credit Card Sales).

Name:

Address.....

.....

.....

SD

Print 'n' Plotter Products

.... ZX SPECTRUM JOTTER @ £9.95 each
.... ZX SPECTRUM KEYBOARD OVERLAYS @ £2.95 per pack
.... ZX SPECTRUM CONSOLE @ £5.25 each
.... ZX PRINTER PAPER @ £12.50 per five rolls
.... ZX SPECTRUM DEMO CASSETTES @ 95p each
.... ZX81 JOTTER PADS @ £3.50 each
.... ZX81 FILMS @ £2.25 each
.... ZX81 GRAPHICS PROGRAMMING GUIDE @ £1.50 each

Remittance enclosed. Please bill my Access/Barclaycard/Visa/Mastercard No:

All prices include VAT, P&P. Overseas orders please add 25% for additional surface mail.

"WHERE CAN I GET THEM?"

You can see and buy most of our products at:
W. H. Smith (Computer Stores)
Boots (selected branches)
Buffer Micro (Streatham 01-769 2887)
Microware (Leicester 0533 29023)
Dennys Bookshops (London EC1 01-253 5421)
Personal Computer Services (Darwen Lancs 0254 776677)
Telford Electronics & Computing (Shifnall 0952 460008)
Georges Bookshop (Bristol 0272 276602)
Microtech Systems (Gillingham Kent 0634 571321)
Northampton Home Computer Centre (0604 22539)
Philip Copley HI FI (Ossett W. Yorks 0924 272545)
Darlington Computer Shop (Darlington 0325 487478)
Lancashire Micros (Morecambe Lancs 0524 411435)
North East Computers (Peterhead 0779 79900)
Photo-Video (Hereford 0432 267997)
Computers for All (Romford 0708 752862)
March Software (Sawbridgeworth Herts 0279 724341)
Evesham Micro Centre (Worcs 0386 48635)
Computer City (Widnes, Cheshire 051 420 3333)
Landau Electronics (Sutton 01-643 5494)
D&J Computers (Stevenage 0438 65501)
Software Machine (London SE3 01-305 0521)
Screen-Scene (Cheltenham 0242 28979)
Hobbyhorse (Lincoln 0522 35227)
Micro Home Computers (Orkney 0856 3283)

Educational Supplies through Griffin & George Ltd.
Australasian agents: Centrum Systems. Tel: (Perth) 4441031.

Some micros may die

THERE ARE conflicting reports about the imminent demise of the home computer market. The affairs of Grundy Business Systems, makers of the NewBrain, are in the hands of a receiver. Sales of the Dragon have been less than expected and predictions of profit have not been realised.

It looks a little like the situation in the U.S., where the price war at the cheap end of the market has meant that both Texas Instruments and Atari computer operations are said to be running at a loss and sales of Timex Sinclair machines have been sliding. The T/S problems led Sir Clive Sinclair to state in his chairman's report detailing the annual results of Sinclair Research that it has resulted in "much lower sales volume in money terms than we expected."

Against that must be set the news of increased profits for Sinclair Research. They rose by 65 percent to slightly more than £14 million on turnover which was doubled to £55.5 million, compared to last year. Prism Microproducts, mainly because of its distribution link with Sinclair, recorded turnover of £10 million in its first year. Managing director Bob Denton said the company is moving between £500,000 and £1 million worth of Sinclair goods each week.

In addition, there is the news of the deal for the sale and making of ZX-81s in China which opens vast new possibilities. The fact that the deal was agreed so quickly shows how keen the Chinese must be to take advantage of this new piece of technology and join the computer age. Other business



people who have tried selling in that market must be envious of the speed with which the business was transacted.

At first sight it would appear that the situation on the other side of the Atlantic is being repeated here, with a few notable exceptions. On closer inspection, however, it is more likely that it exemplifies the differences between the two markets. In the States there is a definite split between the games consoles produced by makers such as Atari and Mattel and home computers like those of Commodore and Texas Instruments.

Sinclair entered that market with its British background of satisfying both areas just as there were moves in the U.S. to link them more closely. The ZX-81, and later the T/S 1000, however, were looked on mainly for their ability in the home business market and their attractiveness rested on their low price. When the competition responded by cutting prices, despite the likelihood of losing money, customers moved to machines with better capabilities.

The troubles in Britain seem to stem mainly from special problems exceptional to the companies involved. Grundy was taking-over a machine which was out-of-date by the time it was launched. What had been a new idea when it was conceived had been overtaken by the Sinclair machines, while its own future was being affected by delays. There is a chance that the NewBrain will survive but the market for which it is intended will have to be re-appraised.

Dragon difficulties appear to be the opposite of those suffered by Sinclair. Instead of under-estimating the market, the company was too optimistic of prospects and budgeted accordingly. It is also likely to be under pressure from its parent, Mettoy the toy maker, which has been looking to Dragon to ensure its future. Last year it had to sell part of Dragon for new finance to enable the company to take advantage of growth prospects in the computer market but Dragon is still its main source of income.

The lesson from both the problem companies seems to be that although there are great opportunities in the home



computer market, it is not immune to the normal constraints of business. No-one, not even Sinclair Research, can afford to ignore them, although Sinclair is probably in a better position than most. As it was first into the market, it has had a little more time than others to put itself into good shape, a process which has been proceeding since the company was started four years ago.

That kind of extra time does not exist for the companies which have since started selling home computers. Even the production of a successful machine is no guarantee of business success. Dragon has regularly been one of the top-sellers but that did not prevent it running into difficulties.

As in all businesses, the route to success is to predict demand accurately and adjust supply to meet it. It would appear that demand for home computers is not so easy to predict as some would have believed. With a potential of all the homes in Britain and the sales having reached only about 10 percent of them, it would have been logical to expect that any machines with a reasonable specification and price would sell as fast as they were produced.

Dragon found that was not so. The conclusion to be drawn is that the potential market is not that big, at least not until the price falls to that of a large calculator.

Sinclair experience, however, is that it can sell all its Spectrums, yet the ZX-81, despite its low price, is falling from



favour. That can be rationalised by saying that Sinclair is in a class of its own and has found its niche in the market for a relatively low-cost machine with relatively high specifications. The BBC Model B machine is in a similar situation but the rest are chasing what is left.

With more and more machines seemingly arriving every week, the chasing will become ever more frantic until the manufacturers which fail to get it right have to call it a day. It is unlikely that will happen before Christmas, given the pre-festive boom which can be expected. By this time next year, however, following the fall in sales at the beginning of the year, it could be that many of the less familiar names will no longer be with us.

All of this, of course, would be proved wrong if some company offered a 48K machine with colour, sound and expansion capabilities for less than £10, but is that likely?

EXCITING ADDITIONS FOR YOUR HOME COMPUTER

THE MAPLIN TALK-BACK for ZX81 and VIC20

Now your computer can talk

- ★ Allophone (extended phoneme) system gives unlimited vocabulary.
- ★ Can be used with unexpanded VIC20 or ZX81 — does not require large areas of memory.
- ★ In VIC20 version, speech output is direct to TV speaker with no additional amplification needed.
- ★ Allows speech to be easily included in programs.

Complete kits. Order As:
LK00A (VIC20 Talk-Back). Price £24.95.
LK01B (ZX81 Talk-Back). Price £19.95.
Full construction details in Maplin Projects Book 6. Price 70p. Order As XA06G.

SOUNDS GENERATOR FOR ZX81

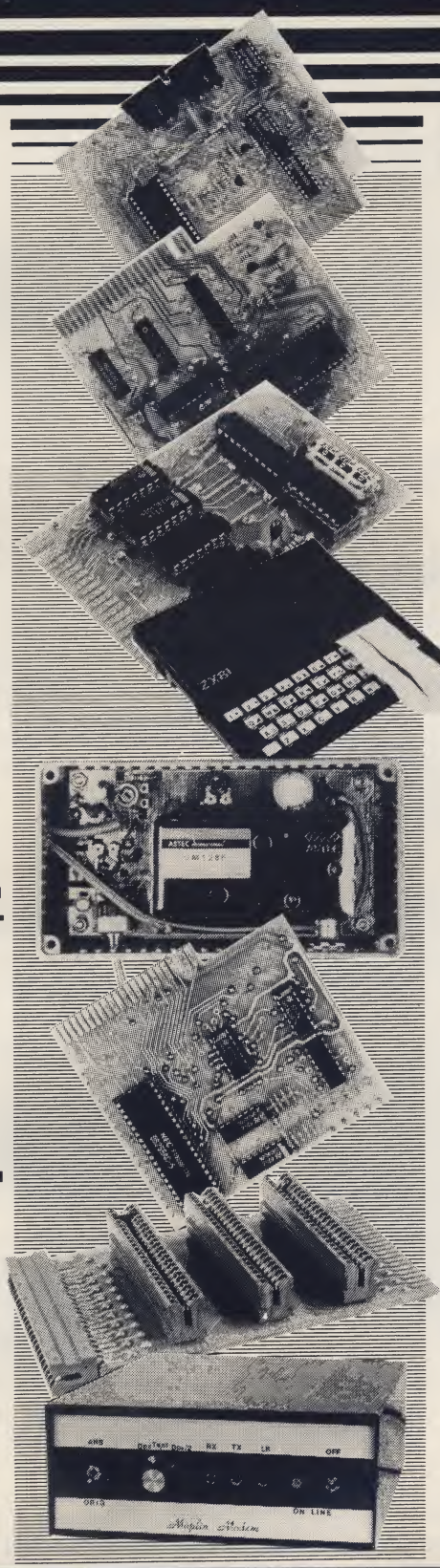
3-Programmable tone generators with programmable attenuators turns your ZX81 into a mini-synthesiser.
Noise generator with 3 pitch levels enables the creation of most special effect sounds.
Single address access via BASIC with PEEK and POKE. Connects directly to expansion port socket or motherboard.
Complete kit. Order As LW96E. Price £10.95.
Full construction details in Maplin Projects Book 5. Order As XA05F. Price 70p.

ZX81 INPUT/OUTPUT PORT

Two bi-directional ports for a total of 16 input or 16 output lines.
Includes one buffered output which can interface directly to CMOS.
On board address selection allows for expansion to 6 ports with two boards.
Complete kit. Order As LW76H. Price £9.25.
Full construction details in Maplin Projects Book 4. Order As XA04E. Price 70p.

MODEM

A CCITT standard modem that connects directly to your telephone line via a B.T. approved transformer. Transmits and receives simultaneously on European standard frequencies at 300 baud. May be used to talk to any other 300 baud European standard modem including the Maplin Computer Shopping modem on 0702 552941 and any British Telecom Datel 200/300 Service modem.
The modem's computer interface is RS232 compatible.
A complete kit excluding case is available. Order As LW99H. Price £39.95.
Full construction details in Maplin Projects Book 5. Order As XA05F. Price 70p.



KEYBOARD with ELECTRONICS for ZX81

- ★ Full size, full travel keyboard that's simple to add to your ZX81 (no soldering in ZX81).
- ★ Complete with electronics to make "Shift Lock", "Function" and "Graphics 2" single key selections.
- ★ Powered (with adaptor supplied) from ZX81's own standard power supply.

Full details in Project Book 3 (XA03D). Price 70p
Complete kit (excl. case) £21.90.
Order As LW72P.
Case £4.95. Order As XG17T.
Ready built-in case £29.95.
Order As XG22Y.



ZX81 TV SOUND

ZX81 sound on your TV set.
Video reversing switch for normal or inverse video display. Can be used with the Talk-Back or Sounds Generator kits.
Complete kit. Order As LK02C. Price £19.95.
Full construction details in Maplin Projects Book 6. Order As XA06G. Price 70p.

ZX81 EXTENSION BOARD

Our ZX81 Extendiboard plugs directly into the ZX81 expansion port and will accept a 16K RAM pack and three other plug-in modules simultaneously. Parts are sold separately as follows:
PCB Order As GB08J. Price £2.32.
Edge Connectors (4 needed) Order As RK35Q. Price £2.39 each.
Track pins (1 pack needed). Order As FL82D. Price 85p per pack of 50.

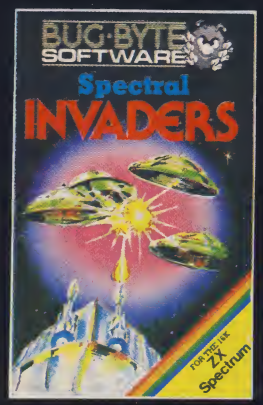
INTERFACES for MODEM

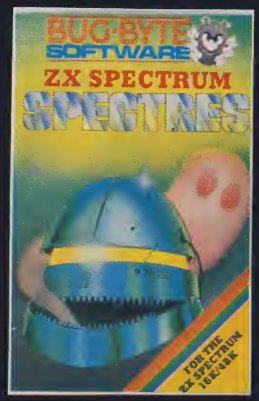
Interfaces for most popular home computers which do not have RS232 ports will be available shortly. An interface for the ZX81 that includes a complete Machine Code Communications Program is available. Order As LK08J (ZX81 Modem Interface Kit). Price £24.95.
Full construction details in Maplin Projects Book 7. Order As XA07H. Price 70p.

MAPLIN

Maplin Electronic Supplies Ltd., Mail Order: P.O. Box 3, Rayleigh, Essex SS6 8LR.
Tel. Southend (0702) 552911 (Sales).

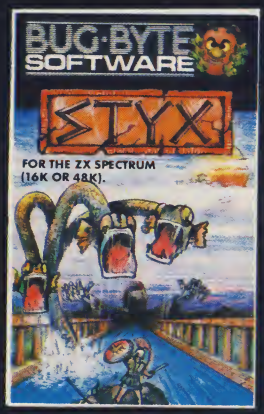
159-161 King St., Hammersmith, W6. Tel. 01-748 0926. 284, London Road, Westcliff-on-Sea, Essex.
Tel. (0702) 554000. Lynton Square, Perry Barr, Birmingham. Tel. (021) 356 7292.
All prices include VAT & carriage. Please add a 50p handling charge to orders under £5 total value.



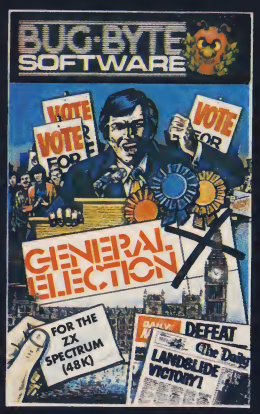




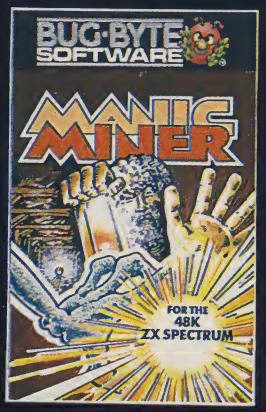














TOP TEN



Available in all good software stockists. Dealer enquiries contact **MATTHEW THOMAS** on **051-709 7071**

BUG-BYTE SOFTWARE™

Mulberry House, Canning Place, Liverpool L1 8JB.

MAJOR PRICE BREAKTHROUGH!

SINCLAIR ADD ONS

MicroCare KEEPS YOUR COMPUTER HUMMING!

MC1 Spectrums and Dragons only £22.40+(£1.50 p+p)
MC2 ZX 81 only £15.50+(£1.50 p+p)
MC3 Atari 400 and 800 only £24.90+(£2.00p+p)
MC4 Commodore VIC 20+C64 only £24.90+(£2.00p+p)
MC5 BBC Micro A+B only £24.90+(£2.00p+p)

No, you're not dreaming! Those are the prices charged by MicroCare for repairing any electronic fault, however serious, in the above computers. They are £££££'s below the price of Sinclair's repair service, **and we give a guarantee!**

We'll return it promptly, and we'll quality check your unit before it leaves our service centre.

We have the experience it takes. We have the parts on hand. So act now. Let MicroCare get your computer humming again!

When sending in your computer, please enclose a brief description of the fault, and make sure that your address is clearly indicated. **Do not send leads or power plugs.**

Cheques to be made payable to MicroCare, Order ref: MC1 £22.40+(£1.50p+p)
MC2 £15.50+(£1.50p+p)
MC3 £24.90+(£2.00p+p)
MC4 £24.90+(£2.00p+p)
MC5 £24.90+(£2.00p+p)

14 KNIGHTON ROAD
FOREST GATE
LONDON E7 0EE

16K Memory extension for only £15.99!



FABULOUS SINCLAIR ADD-ON OFFER FOR ZX81 OWNERS

These are the real thing. ZX81 memory extensions made for the USA and specifically screened to stop radio interference.

- ★ **no soldering**
- ★ **easy to fit**
- ★ **simply plug in**
- ★ **no loss of memory through wobble or white out**

Fully Guaranteed for 12 months

ME1-16USA £15.99 plus 60p P + P



FANTASTIC ZX81 & SPECTRUM SS1 SPEECH SYNTHESISER SIZE 3½" x 5¾" x 1"

- ★ Making amazing speech effects with your ZX Spectrum.
- ★ Specially designed for use with your Spectrum. Just plugs in, no dismantling or soldering.
- ★ No power pack, leads, batteries or other extras.
- ★ Ample volume from built in loudspeaker, Manual Volume Control on panel. Can be plugged in to existing hi-fi system.
- ★ Uses no memory addresses.
- ★ Free Dictionary of Sounds.

SS1 SPEECH SYNTHESISER £39.00 plus 60p P + P

NEW TAPE LOAD ANXIETY?

Vu load takes the frustration out of loading your ZX81 or Spectrum programmes.

- ★ **helps to ensure programme load every time**
- ★ **monitors tape output level**
- ★ **gives positive save indication**
- ★ **detects blank tape without disconnecting cassette wires**
- ★ **ready to use – no wiring**

TL £19.99 plus 60p P + P

NEW MICRO TAPE

save it – first time on American microtape

- ★ **Specially designed for use with micro computers**
- ★ **Low drop out occurrance**
- ★ **Uniform coating**
- ★ **High saturation level**
- ★ **So good, we can guarantee them for 12 months**

AUDIO DIGITAL AD.C12 – 55p; AD.C15 – 60p; AD.C20 – 65p; + 40p P + P

NEW LOW PRICE Series B ONLY £20.50!

Spectrum 16K-48K

With our ME48 memory expansion add-ons your Spectrum can increase its capacity by up to three times.

★ **no soldering**
★ **easy to fit**
★ **simple to plug in**
★ **fully guaranteed**
★ **no loss of memory through wobble or white out.**

NB. Before ordering your Spectrum add-on please check which Spectrum you have in your possession. At the back of the ZX Spectrum the metallic contact strips can be clearly viewed. In the series A the space separating the strips is the same width as the strips. In the series B the strips are twice as wide as the space between.

SPECTRUM

ME16-48 Series A £34.50 plus 60p P + P
Series B £20.50 plus 60p P + P
ME16-80 Series B £46.00 plus 60p P + P

ZX81

ME1-64 £44.25 plus 60p P + P

FITTING/TESTING SERVICE. While you wait, personal callers Monday – Friday 9.30-5.00, £3.00. By return of post £7.00.

NEW

LEVEL-VU PRISM

Allows you to see your tape counter without moving from your seat!

★ **attaches easily to recorder body or lid**
★ **fits most recorders including Radio Shack, Vic-20, Atari**
★ **greatly magnifies counter numerals**

LVP £3.99 plus 40p P + P

COMPUTER STANDS

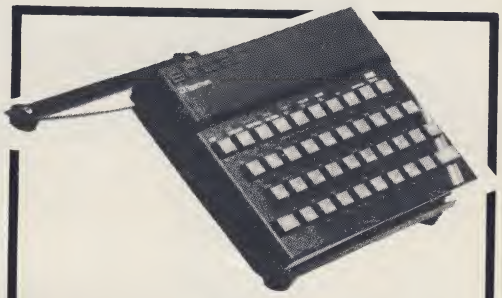
POWER BASE

Raised stand for ZX81 and Spectrum. Fitted LOAD/SAVE switch, and power ON/OFF for screen clearing. Saves wear and tear on connections. Front lip holds computer in place. No soldering, comes complete with all necessary plugs and cables.



Spectrum ref. PBS1 £13.50 plus 95p P + P

ZX81 ref. PBZX81 £13.00 plus 95p P + P



COMPUTILT STAND

Designed to tilt the computer to a better working position. Front lip holds computer in place. Also useful as a document stand when entering information.

Spectrum or ZX81 ref. CS1 £4.50

plus 60p P + P

WOBBLE STOPPERS

At last, a fool proof method of avoiding ZX81 whiteouts caused by Ram-Pack wobble. Simply turn the plastic thumbscrew until the Ram-Pack is held firmly against the ZX81. No soldering no stick-on pieces, just common sense!
Flat or tilted models:



Small flat ZX81 and Ram-Pack ref. SW
plus 60p P + P **£5.25**



Small tilted for ZX81 and Ram-Pack ref. STW
plus 60p P + P **£6.25**



Large flat or tilted for ZX81 and Ram-Pack and Printer ref.
LW **£5.75** flat LTW **£6.75** tilted plus 60p P + P

COMPUTER ADD ONS

7-9 Thane Works, Thane Villas, London N.7. Tel: 01-609 7919

Trade enquires welcome

ALL ITEMS NORMALLY DESPATCHED WITHIN 24 HOURS

Please tick appropriate box to order your Computer Add-On. MC1 ☐ MC2 ☐
MC3 ☐ MC4 ☐ MC5 ☐ ME16USA ☐
ME16-48 Series A ☐ Series B ☐ SS1 ☐
TL ☐ ADC12 ☐ ADC15 ☐ ADC20 ☐
ME16-80 Series B ☐ ME1-64 ☐
LVP ☐ PBS1 ☐ PBZX81 ☐ CS1 ☐
SW ☐ STW ☐ LW ☐ LTW ☐

NB. Add Post and Packing to the price of each item.

I enclose a cheque or postal order for_____ made payable/crossed to Computer Add-ons or MicroCare or I would like to pay by Access or Barclay Card and I enter my number and signature accordingly.

*Allow 28 days for delivery.

☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐.☐☐

Signature _____

Date _____

Name _____

Address _____

Occupation _____

SUII/83

COMPUTER ADD-ONS
7-9 Thane Works, Thane Villas London N7

BOOK A TEST FIGHT TODAY!



You'll have a REAL fight on your hands when you tackle our new games.

They're all-action games designed to push your senses to new limits. Take "Brain Damage"; trapped in your computer's micro-circuits you'll need all your resources to defeat the CPU's electron panzers ... and if they don't get you, the Rogue Programs will.

When you get your breath back you'll be running for your life again in "Exterminator". Transported into the future you'll find that earth is a very different place. Robots rule the world and the human race is almost extinct, there's only one family left. You have to save them ... but hurry you don't have much time.

Sitting in defense command, your hands poised at the controls, you scan the sky for activity knowing that it will shortly erupt. "Armageddon" is about to begin ... only YOU can save the last six cities.

If you're still in control of your senses you can try your hand at rescuing the miners trapped on Titan ... easy you think! Ride your ship through the mini-meteor storm and pick up the men. But you didn't reckon on the corporation spaceships making this "Mission Impossible".

Book your test flight today. Buy any of Silversoft's new games and find out if you're really in control.

To: Silversoft Ltd. London House, 271/273 King St, London W6

Please send me

.....

I enclose a cheque/postal order for:

Please debit my ACCESS No

Name

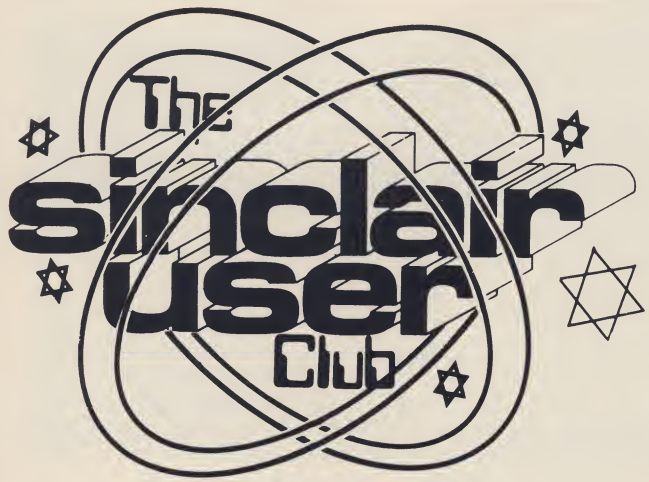
Address

.....

.....

All games run on any ZX-SPECTRUM and cost £5.95, write today for full details of our complete range of software.

Selected titles are available at W.H. SMITHS, BOOTS, JOHN MENZIES, and at all good computer stores.



Special offer games for the ZX-81 and Spectrum

THE SPECIAL offers this month are made up of software with the usual 20 percent off the manufacturers' recommended price. The first three are for the ZX-81 from Micro-Gen. **ZX-Chess** is an old favourite and if you do not have a chess program, this is the one for you. It is a very strong player, even on level one, so there will be plenty of competition with it.

Scramble takes its plot from the original arcade game. You must dodge all the alien craft in the cavern and drop your bombs on to the enemy installations at exactly the right time.

Rescue completes the trio and provides adventure fun on the 16K ZX-81.

The offers for the Spectrum include three games from Imagine. All are arcade games with fantastic graphics and arcade-quality sound.

As usual, all the offers are open only to club members and they will be available until the end of November. To help new members take immediate advantage of the savings this month, they should include their order with their membership applications.

Bi-monthly club cassette available to all club members.
Special discounts on hardware, software and books.
Members recover their membership fee many times over.
Free Club software.
Machine code teach-in.
Telephone Helpline.
Technical advice.

CLUB BENEFITS

	Usual price	Offer price
ZX-81		
Mikro Gen		
ZX-Chess	**£6.50**	**£5.20**
Scramble	**£3.95**	**£3.16**
Rescue	**£4.95**	**£3.95**
Spectrum		
Imagine		
Z-Zoom	**£5.50**	**£4.40**
Zip Zap	**£5.50**	**£4.40**
Arcadia	**£5.50**	**£4.40**

Helpline to better loading performance

DIRTY OR WORN HEADS THE MAIN CULPRITS

THIS MONTH we thought we would examine the major areas of difficulty for which our members telephoned the Helpline. Cassette recorders and loading problems seem to be at the head of the list, especially where newcomers to the Club are concerned.

Club investigations have shown that a very small percentage of the difficulties can be attributed to the tapes or the original recording method. Dirty or worn heads are the main culprits of poor loading performance, or the usual azimuth adjustment is set incorrectly.

Azimuth alignment refers to the head being aligned correctly to the tape path through the recorder. The club has a cassette alignment service.

If members are experiencing problems and do not feel qualified to make adjustment, further details are available on request.

There is also a standard Help sheet which should enable members to solve their loading problems.

The Club series on machine code programming seems to have generated great interest and the general level of competence appears to be very high. We are always receiving requests for back issues from members who have joined the club recently and who have become intrigued by the series.

MEMBERSHIP FORM

I wish to join the Sinclair User Club and enclose my subscription of £12

Name

Address

.....

.....

.....

Which computer do you own?

ZX-81 ☐ Spectrum ☐

Send your coupons to Sinclair User Club, ECC Publications, 196-200 Balls Pond Road, London N1 4AQ. Cheques should be made payable to Sinclair User Club.

Sinclair User Club

Britain

Aylesbury ZX Computer Club: Ken Knight, 22 Mount Street, Aylesbury (5181 or 630867). Meetings: first Wednesday and third Thursday of the month.

Basildon Microcomputer Club: Roger Sims, Wickford 63032, after 6.30pm. Meetings every other week on Tuesdays from 7.30 to 10pm at Healey Management Services, The Hemmels, Laindon, Essex.

Bristol Yate and Sodbury Computer Club: 99 Woodchester Yate, Bristol, BS17 4TX.

Colchester Sinclair User Group: Richard Lown, 102 Prettygate Road, Colchester CO3 4EE.

Crewe and Nantwich Computer Users' Club: J E A Symondson, 46 London Road, Stapeley, Nantwich, Cheshire CW5 7JL.

Doncaster and District Micro Club: John Woods, 60 Dundas Road, Wheatley, Doncaster DN2 4DR; (0302) 29357. Meetings held on second and fourth Wednesday of each month.

Eastwood Town Microcomputer Club: E N Ryan, 15 Queens Square, Eastwood, Nottingham NG16 3BJ.

Edinburgh: Edinburgh Home Computing Club. John Palmer (031 661 3183) or Iain Robertson (031 441 2361).

EZUG-Educational ZX-80–81 Users' Group: Eric Deeson, Highgate School, Birmingham B12 9DS.

Furness Computer Club: R J C Wade, 67 Sands Road, Ulverston, Cumbria (Ulverton 55068). Meets every other week on Wednesday evenings.

Glasgow ZX-80–81 Users' Club: Ian Watt, 107 Greenwood Road, Clarkston, Glasgow G76 7LW (041 638 1241). Meetings: second and fourth Monday of each month.

Gravesend Computer Club: c/o The Extra Tuition Centre, 39 The Terrace, Gravesend, Kent DA12 2BA. Bi-monthly magazine and membership card.

Hassocks ZX Micro User Club, Sussex: Paul King (Hassocks 4530).

Inverclyde ZX-81 Users' Club: Robert Watt, 9 St. John's Road, Gourock, Renfrewshire PA19 1PL (Gourock 39967). Meetings: Every other week on Monday at Greenock Society of the Deaf, Kelly Street, Greenock.

Keighley Computer Club: Colin Price, Redholt, Ingrow, Keighley (603133).

Lambeth Computer Club: Robert Barker, 54 Brixton Road, London SW9 6BS.

Liverpool ZX-Computer Centre: Keith Archer, 17 Sweeting Street, Liverpool 2.

Manchester Sinclair Users' Club: Meets every Wednesday, 7.30pm, at Longsight Library, 519 Stockport Road, Longsight — 061-225 6997 or 061 445 6316.

Merseyside Co-op ZX Users' Group: Keith Driscoll, 53 Melville Road, Bootle, Merseyside L20 6NE; 051-922 3163.

Micro Users' Group: 316 Kingston Road, Ewell, Epsom, Surrey KT19 0SY.

Newcastle (Staffs) Computer Club: Meetings at Newcastle Youth and Adult Centre, Thursday, 7.30 to 10 pm. Further information from R G Martin (0782 62065).

North Hertfordshire Home Computer Club: R Crutchfield, 2 Durham Road, Stevenage; Meetings: first Friday of the month at the Settlement, Nevells Road, Letchworth.

Northern Ireland Sinclair Users' Club: P Gibson, 11 Fitzjames Park, Newtownards, Co Down BT23 4BU.

North London Hobby Computer Club: ZX users' group meets at North London Polytechnic, Holloway Road, London N7 each Monday, 6pm.

Nottingham Microcomputer Club: ZX-80–81 users' group, G E Basford, 9 Holme Close, The Pastures, Woodborough, Nottingham.

Nottingham ZX Spectrum Club: Would like to hear from new members. D Beattie and P Riley, 53 Kingsley Crescent, Sawley, Long Eaton, Nottingham NG10 3DA.

Orpington Computer Club: Roger Pyatt, 23 Arundel Drive, Orpington, Kent (Orpington 20281).

Perth and District Amateur Computer Society: Alastair MacPherson, 154 Oakbank Road, Perth PH1 1HA (29633). Meetings: third Tuesday of each month at Hunters Lodge Motel, Bankfoot.

Regis Amateur Microcomputer Society: R H Wallis, 22 Mallard Crescent, Pagham, Bognor Regis, West Sussex PO21 4UU.

Scunthorpe ZX Club: C P Hazleton, 26 Rilestone Place, Bottesford, Scunthorpe; (0724 63466).

Sheffield: South Yorkshire Personal Computing Group. Enquiries to R Alderton (0742 20571), S Gray (0742 351440), P Sanderson (0742 351895).

Sittingbourne: Anurag Vidyarth (0795 73149). Would be interested to hear from anyone who wants to start a club near the Medway towns.

St Albans: Bi-monthly meetings and a magazine. Details from Adam Slater, 40 Watford Road, St Albans, Herts AL1 2HA. Telephone: 0727 54176.

Stratford-on-Avon ZX Users' Group: Chris Parry, 16 Sackville Close, Stratford-on-Avon, Warwickshire.

Swansea Computer Club: B J Candy, Jr Gorlau, Killay, Swansea (203811).

Swindon ZX Computer Club: Andrew Bartlett, 47 Grosvenor Road, Swindon, Wilts SN1 4LT; (0793) 3077. Monthly meetings and library.

Sutton: Sutton Library Computer Club, D Wilkins, 22 Chestnut Court, Mulgrave Road, Sutton, Surrey SM2 6LR.

West Sussex: Midhurst and District Computer User Group. Enquiries to V Weston (073 081 3876), R Armes (073 081 3279).

Worle Computer Club: S W Rabone, 18 Castle Road, Worle, Weston-super-Mare BS22 9JW (Weston-super-Mare 513068). Meetings: Woodsprings Inn, Worle, on alternate Mondays.

ZX-Aid: Conrad Roe, 25 Cherry Tree Avenue, Walsall WS5 4LH. Please include sae. Meetings twice monthly.

ZX-80/ZX-81 Users' Club: PO Box 159, Kingston-on-Thames. A postal club.

Overseas

Austria: ZX User Club, Thomas Christian, c/o Wissenschaft Forscht e. V., Postfach 141, A1190 Vienna. Meets every first Friday of the month. Telephone 0222-44 32 050 for details.

Belgium: ASBL BDMA Belgium National Sinclair Club; P Glenisson, Rue De l'Epeestraat, 14, 1200 Bruxelles.

Belgium, France and Luxembourg: Club Sinclair, Raymong Betz, 38 Chemin du Moulin 38, B-1328 Ohain, Belgium (322 6537468).

Belgian User Group for Sinclair owners (BUGS); Op de Beeck, Patrick, Drabstraat 144, 2510 Mortsel.

Micro-Europe Club; R Betz, Chemin du Moulin, B1328, Ohain, Belgium. Telephone: CCP 000 0846556–37.

Denmark: Danmarks National ZX-8081 Klub (DNZK), Jens Larson, Skovmosevej 6.4200 Slagelese, post giro 1 46 24 66.

ZZ-Brugergruppen i Danmark, Boks 44, 2650 Hvidovre, Gratis medlemskab og gratis blad til enhver interesseret.

J Niels-Erik Hartmann, OZ-ZX-Radioamator, Bruger Gruppe, Bredgade 25 DK-4900, Nakskov.

East Netherlands: Jonathon Meyer, Van Spaen Straat 22,6524 H.N. Nijmegen; (080 223411).

Germany: ZX-80 Club, a postal club; contact Thomas Jencyzyk. Hameln, Postfach 65 D-3250 Hameln, Germany.

Indonesia: Jakarta ZX-80/81 Users' Club, J S Wijaya, PO Box 20, Jkukg, Jakarta, Utara, Indonesia.

Irish Amateur Computer Club: Martin Stapleton, 48 Seacourt, Clontarf, Dublin 3. (331304).

Italy: Sinclair Club, Vie Molimo Vecchio so/F, 40026 Imola, Italy.

Genova Sinclair Club; Vittorio Gioia, Via F Corridoni, 2-1, telephone 010 3125 51.

Micro-Europe: Belgium or Club Paris-Micro, 19 Rue de Tilly, 92700, Colombes, France; associated with Club Micro-Europe.

Republic of Ireland: Irish ZX-8081 Users' Club, 73 Cnoc Crionain, Baile Atha, Cliath 1.

Singapore: Sinclair Users' Group: Eric Mortimer, 1D Wilmer Court, Leonie Hill Road, Singapore.

South Africa: Johannesburg ZX-80–81 Computer Users' Club: S Lucas, c/o Hoechst SA (Pty) Ltd, PO Box 8692, Johannesburg.

Johannesburg ZX Users' Club: Lennert E R Fisher, PO Box 61446, Marshallstown, Johannesburg.

Spain: Club Nacional de Usuarios del ZX-81, Joseph-Oriol Tomas, Avda. de Madrid, No 203 207, 10, 3a esc. A Barcelona-14 Espana. International ZX Spectrum Club: Gabriel Indalecio Cano, Sardana, 4 atrico 2a, San Andres de la Barca, Barcelona. Send international reply coupon. Produces a bi-monthly magazine. Spanish ZX Micro Club: Apartado 181, Alicante (Costa Blanca), Spain.

ZX Club Spain; C Benito PO Box 3253, Madrid, Spain.

Swedish ZX-club: Sinclair Datorklubben, Box 1007, S–122, 22 Enskede, Sweden.

United States: Bay Area ZX-80 User Group, 2660 Las Aromas, Oakland CA94611.—Harvard Group, Bolton Road, Harvard MA 01451: (617 456 3967).



Is your ZX Spectrum making the most of your child's intelligence?



Will your child be taking an 'O' level in Space Invaders? Of course not. That's why Heinemann have *introduced a range of computer games* specially designed to help your child's future.

They're both educational and fun, because as all good teachers will tell you children learn more effectively when they are having fun.

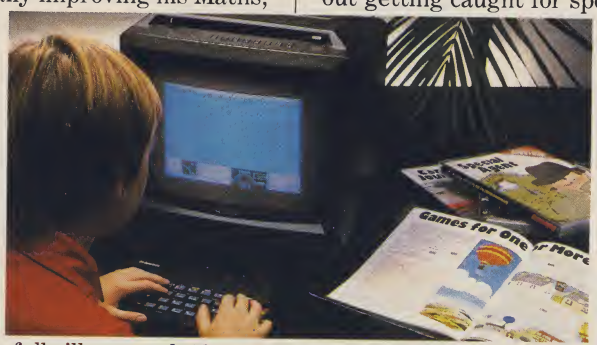
So the beauty of it is, your child will think he's mastering a new game. But you know he's really improving his Maths, or English, or Geography or any one of a range of skills and subjects.

Heinemann have for many years been publishing the books your children are using at school.

Now Heinemann are bringing the same expertise and experience to the development of educational computer games for your children to use at home.

With each of these special educational games, designed for 8-12 year olds, you don't just receive a computer program on a cassette. You also get an absorbing, fully illustrated, 16 page book which is packed with facts and information which extends the program and provides ideas for further exciting and educational activities.

The four programs are:



SPECIAL AGENT

As you chase the enemy agent around Europe, you will need to consult travel timetables, respond to intelligence reports, some in code even, and plan your international route. With only a limited amount of money to spend in tracking him down, careful budgeting and a knowledge of Europe are quickly learnt.

BALLOONING

You are flying high above an unknown landscape in a hot air balloon. Will you have enough fuel to climb over the mountain?

Can you master the principles (and physics) of lighter-than-air flight and land safely, avoiding the hazards? Enjoy exploring the science of such flight as you learn to fly the balloon on a series of adventures.

CAR JOURNEY

How quickly could you drive from Exeter to Glasgow, without getting caught for speeding and without running out of petrol? What is the best route from Dover to Liverpool and how much petrol will you need? Could you manage the necessary calculations and decisions to run a successful delivery service? Travel the roads of Britain and enjoy finding out!

PUNCTUATION PETE

Your program to make the acquisition and practice of language skills a real joy! 'Pete' is your guide through a carefully structured series of passages which need punctuating.

Available direct from Heinemann Educational Books, FREEPOST, 22 Bedford Square, London WC1 3BR at only £9.95 including postage and VAT.

Also available from Boots, Dixons, Menzies, W. H. Smiths and other leading retailers. These games will bring a new and worthwhile dimension to your home computer.

NB Run only on 48K Spectrums.

HEINEMANN FIVE WAYS SOFTWARE



Because there's more to life than dead aliens.

To: Heinemann Educational Books, FREEPOST, 22 Bedford Square, London WC1 3BR. (No stamp needed).

Yes I would like to improve my child's education. Please send me the program(s) indicated at £9.95 each inc. VAT & postage.

Tick box(es):

Special Agent ☐ Ballooning ☐ Car Journey ☐ Punctuation Pete ☐

I enclose a cheque/postal order payable to Heinemann Educational Books Ltd., for £_____ Or please debit my Access/Barclaycard/American Express

aSU11

Card No. ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Signature_____

Name (BLOCK CAPITALS PLEASE)_____

Address_____

_____ Postcode _____

Reg in England No. 677944

Prices apply to U.K. only.

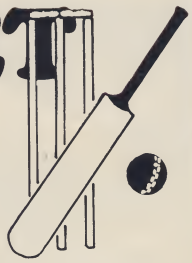
CRICKET

FOR

ZX SPECTRUM 48K

By David Owen

Look at these features:



★ ***EXCITING MATCHES*** in which your decisions really count. Make bowling changes and field positionings; tell your batsmen to score faster or to be more defensive.

★ ***INTELLIGENT PROGRAM:*** The Spectrum decides your opposition's strategy skilfully and logically.

★ ***DETAILED PLAYER CHARACTERISTICS:*** Get to know your team's strengths and weaknesses.

★ ***INFINITE OPPOSITION:*** Including all the County sides. Ten difficulty levels.

★ ***BALL BY BALL COMMENTARY*** — scoreboard, scorecard and many interesting and helpful features.

★ ***USES 48K to the full!***

A realistic, addictive and enjoyable game

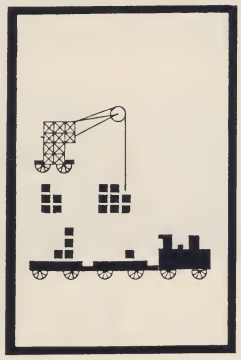
£6.95 including post and packing and full instruction booklet. Export orders add £1.00

T. J. OWEN, NORLINGTON, LEWES ROAD, EAST GRINSTEAD, W. SUSSEX RH19 3TA

Trade enquiries welcome.

SPECTRUM FOR YOUNG CHILDREN

COLOURFUL FUN EDUCATIONAL GAMES FOR 2 to 8 YR OLDS WITH SUPERB GRAPHICS, SOUND AND ANIMATION



SHAPE SORTER 16/48k 5.25
3 animated programmes to aid shape recognition observation and size sorting.

COUNTING 16/48k 5.25
4 grades programmes good as a first introduction to numbers.

ALPHABET 16k or 49k 5.25
Full screen pictures for each letter, with an option to present lower case.

ADDING & SUBTRACTING 16/48k 5.25
3 animated programmes introducing adding and subtracting.

NEW

PATH FINDER 16/48k 5.95
4 Compelling graded games based on mazes to develop planning and forward thinking. A different puzzle every time on each programme. Each of the programmes appeals to children over a wide age range.

WIDGIT SOFTWARE

48 DURHAM ROAD, LONDON N2 9DT
Tapes are available from W. H. Smith and many retail outlets.

SPOT THE DIFFERENCE!

Spectacular arcade action for your ZX Spectrum from Crystal Computing

Cyber Zone

NEW

Place yourself in the centre of the action with Cyberzone. Superb animated graphics and arcade standard sound effects combine in a fast and furious game of skill and dexterity. Fighter ships randomly climb, bank, turn and dive to shoot out your 8 laser bases as you pulverise the alien mothership hovering ominously on the horizon. Features alien scanner ships, deadly accurate Cyber laser, bonus laser bases progressive difficulty level and unique voice activated laser firing.

ZX Spectrum 48K

VOICE ACTIVATED!

Cosmic Guerilla

Do battle with wave after wave of marauding alien attackers in the meanest arcade action around.

"The sound and graphics combine to make the game good fun and easy to play." ...Sinclair User.

"Way ahead...A very playable game indeed - The graphics are good as well as smooth plus good sound and colour - highly recommended." ...ZX Computing

For any ZX Spectrum

Bug Blaster

NEW

An exciting fast action game crawling with the most slithery nasties ever! Blast the amoeba as they descend upon your laser base - watch them mutate into slimey algae, but beware the algae channeling the amoeba towards you even faster. Features a host of bonus flies and lizards, mutant and schizoid amoeba bonus laser bases, superb animated graphics arcade standard sound effects plus unique voice activated laser firing.

For any ZX Spectrum

VOICE ACTIVATED!



Dealers!
Ring Chris Clarke on 061-205 6603 **NOW** for details of our excellent terms.

Programmers!
We will give your software a FREE professional evaluation send your cassette to us . TODAY!

ALL GAMES ONLY £5.50 P&P included. Please send SAE for our latest full colour catalogue.

Crystal Computing
2 Ashton Way
East Herrington
Sunderland
SR3 3RX

Please Supply:
Cyberzone ☐
Bug Blaster ☐ Cosmic Guerilla ☐
Catalogue (Please enclose SAE 6in. x 9in.) ☐
I enclose cheque/PO for.....
Name.....
Address.....
SU11B

See our ad. on page 14

ZX80/ZX81 and Spectrum Fair

Northern Premier Exhibitions

AT

on Saturday, 1st. October

PUDSEY CIVIC CENTRE

DAWSONS CORNER, STANNINGLEY, NR. LEEDS.
(midway between Leeds & Bradford)

Admission Adults 75p. Children 50p.
10 a.m. till 5.00 p.m.

HARDWARE, SOFTWARE, BOOKS AND MAGAZINES – EVERYTHING FOR ZX USERS

THIS IS A FAIR EXCLUSIVELY FOR ZX COMPUTERS

For tables contact Mike Donnachie 0532-552854 after 4 p.m.



Are your finances driving you mad?

Do you find that working out your finances makes your head buzz? Do you see red?
Don't worry, now you can have Hilton's **Personal Banking System** on your side, giving you a clear head start and (hopefully) putting you back into the black!
Maintain permanent records and fully detailed statements of your finances + Search facility.
Bank Reconciliation module is included to automatically match your Bank Statement to your **PBS** account.

* **ZX81 £9.95 (16K)**
* **ZX SPECTRUM £12.00 (48K)**
* **DRAGON £12.00 (32K)**
* **BBC £9.95 (32K) PBS only**

guaranteed after sales maintenance provided.

NEW RELEASES

SPECTRUM (48K)
GARDEN BIRDS **£6.50**
A captivating introduction to Ornithology and entertaining
PLAY TYPE & TRANSPOSE. £9.00
Compose, transpose key, Play it Save it, Print it!
DRAGON (32K)
UTILITIES 1 **£5.00**
Including Compress, Catalogue and Copy
DISASSEMBLER **£5.00**
Prints either to screen or printer in HEX and MNEMONICS
MEMORY MAP **£5.00**
Over 9 A4 pages of Dragon Memory locations. INVALUABLE!

ORDER by POST (specifying machine)
OR at the POST OFFICE using TRANSCASH ACCOUNT 302 9557

HILTON COMPUTER SERVICES

Hilton Computer Services Ltd (Dept SU) 14 Avalon Road, Orpington, Kent BR6 9AX

Ask for the PBS at your local computerstore.

WHY YOU SHOULD HAVE 2 NEW BOOKS FOR YOUR SINCLAIR ZX SPECTRUM...



60 PROGRAMS - £4.95

(LESS THAN THE PRICE OF A SINGLE CASSETTE!)

A massive software library for the price of a single cassette. Explosive games, dynamic graphics and invaluable utilities, this specially commissioned collection takes BASIC to the limits and beyond.

The most successful software writers have pooled their talents to bury programming cliches and exploit your micro's potential to the full.

INSTANT ARCADE GAMES - £3.95

(INSTANT INVADERS – INSTANT LASERS – INSTANT SPACESHIPS – INSTANT GAMES – INSTANT BASIC!)

With little or no knowledge of BASIC, you can still take a suite of 'skeleton' programs and create your own arsenal of dynamic and totally unique arcade games.

...AND WHERE YOU CAN GET THEM

From all good bookshops. Or fill in the coupon below and return it to Pan Books Ltd., Freepost, P.O. Box 109, 14-26 Baker St., High Wycombe, Bucks HP11 2TD

For immediate 24 hour service 'phone 01-200 0200 and use your credit card.

POST NOW, NO STAMP NEEDED To:
Pan Books Ltd., Freepost, P.O. Box 109,
14-26 Baker Street, High Wycombe,
Bucks HP11 2TD.

YES, Please send me the following 60 PROGRAMS and/or INSTANT ARCADE GAMES at the price shown plus 35p for the first book ordered plus 15p for each additional book to a maximum charge of £1.25 to cover postage and packing.

☐ 60 PROGRAMS (£4.95) ☐ INSTANT ARCADE GAMES (£3.95)

Name (Mr/Mrs/Miss/Ms)_____

Address_____ Post Code_____

I enclose my cheque/postal order for £_____ payable to Pan Books Ltd *or* debit my Access/Visa card no.

Signature_____

Allow up to 15 days for delivery. This offer available within UK only. Pan Books Ltd. Reg. in England. No. 389591 SU/1

Pan

PERSONAL COMPUTER NEWS LIBRARY

Discover the Microcomputer Age

Come along to The Northern Computer Fair and discover for yourself the excitement of the microcomputer age. All you need to know about personal computers, home computers and microcomputer systems for business will be on display at Belle Vue, Manchester from November 24-26. All your questions will be answered at the North's premier personal computer exhibition.

Enthusiasts can see the latest software and hardware technology in action, and for those new to the world of computers this show is a great introduction. Being sponsored by Practical Computing and Your Computer, the leading microcomputing magazines, you can be sure of value for money at £3 a ticket for Adults and £2 for Children under 16.

Travelling to the show is also easy as the organisers have arranged special reduced-price tickets with British Rail which include the cost of admission. For further information ring British Rail Enquiry Bureau on 061-832-8353 before November 11.

The Northern Computer Fair is open between 10.00 am and 6.00 pm every day so come along and bring the microcomputer age alive for you.

For special party rates and further information contact:
The Exhibition Manager,
The Northern Computer Fair,
Reed Exhibitions, Surrey House,
1 Throwley Way, Sutton,
Surrey SM1 4QQ

Sponsored by:

Practical Computing and YOUR COMPUTER



Microdrive selling method is criticised

THERE HAVE been rumours of discontent about the Sinclair Research method of marketing the Microdrive. The company is offering it exclusively by mail order, working in strict sequence through the list of people who bought the Spectrum by mail order last year.

Jeffrey Law bought a Spectrum from a retailer six months ago because of the promise of the Microdrive. He will not be able to obtain one until the full mail order list is satisfied.

"I want to use one for work," he says, "I now will have to wait for a Microdrive longer than people who bought their Spectrum months after I did."

"The system seems unfair to anyone who bought the Spectrum through the retail trade," says Mike Meek, head of the Sinclair User Club. The company disagrees.

"The Spectrum was available solely by mail order from April to November last year," says a Sinclair spokesman, "and it is only fair that people who bought it then before it became widely available should be first served now."

He adds that anyone who bought the Spectrum over the counter can still write to Sinclair Research and ask to be added to the end of the Microdrive mailing list.

It could be several months before Sinclair Research works through the list.

"It depends on the take-up rate," says the spokesman. So far, the response to the Microdrive offer has been very high but demand may tail-off when the eager early birds have been satisfied.

ZX-81 export deal signed with China

SINCLAIR RESEARCH has agreed to supply ZX-81s and Spectrums to the Chinese so that they can develop their own microcomputer industry.

The machines will be shipped to China as kits, where they will be assembled at a factory in Guangzhou, the zone in which production of home computer products will be concentrated.

Prism Microproducts, the Sinclair Research main distributor in the U.K., has also won a contract for a series of exhibitions to help British microcomputer companies which produce hardware and software for Sinclair machines to enter the Chinese market.

The Chinese companies involved, the South China Computer Co and the China Electronics Import and Export Corp, are giving an undisclosed amount for the development of the industry.

The Chinese are taking the subject of computers very seriously and companies such as Sinclair and Prism are keen to help. Richard Hease, chairman of Prism Microproducts, hopes to be able to fund the installation of more than 20,000 microcomputers in Chinese homes on a trial basis next year.

Special computer programs are being written to produce Chinese characters on the machines. They are being developed by the Beijng Software Academy.

Major firm stops trading

KAYDE, a big manufacturer of ZX-81 and Spectrum software and hardware, has been put into liquidation.

The company ceased trading on August 26.

Customers who have replied to Kayde advertisements in *Sinclair User* should contact the advertising department by letter. Alternatively, Kayde can be contacted on 0799 26009.

Flat screens launched

THE SINCLAIR flat-screen pocket television has finally arrived. Following months of speculation about the new leap forward in technology, Sir Clive Sinclair launched his latest product.



Smaller than the average paperback book, the television is thought to be far in advance of other attempts at making a flat screen. It uses a single chip for the circuitry and the cathode ray tube is set at right angles to the screen so that the rays are bent.

The sets will be sold initially by mail order and will cost £79.95. It will be some time before they are readily available and demand is expected to exceed supply. Production of 10,000 models is planned by Christmas. Speaking of the new product, Sir Clive said it is a major breakthrough. "I believe it can achieve for television what the transistor did for radio,' he says.

Too small to be used as a computer monitor, the television set eventually will form the basis of a slightly bigger screen to make a properly-portable computer system. That has been tipped widely as a move upmarket into business machines.

Going for growth

IN ITS FIRST year, Prism Microproducts, the sister company of ECC Publications which publishes *Sinclair User,* has built a turnover of about £10 million on which the pre-tax profit was £234,000.

Most of the turnover is the result of the deal with Sinclair Research giving it exclusive distribution to retailers in Britain of the company's computers and software. Bob Denton, managing director, says that the company is distributing between £500,000 and £1 million worth of Sinclair equipment every week.

Since being set up in June last year the company has expanded into distributing software for other machines, such as the Vic-20 and the BBC Model B. It now provides a rack-jobbing service which was introduced recently into Rumbelows shops and is looking at a revolutionary electronic distribution system.

It is also part of the group which is involved with Micronet 800, the database on Prestel which can be accessed using home computers with a special adapter. Prism sells the adapter and there are now models for the BBC Model B and Spectrum.

Spectrum helps in inner city

UNEMPLOYED people in London's King's Cross area will be able to learn about computers in a newly-converted former butcher's shop. Two 48K Spectrums are taking their place beside sewing machines and other teaching facilities in an informal workshop run by the Centaur Project, a voluntary youth and community venture which aims to alleviate some of the problems of a deprived urban area.

The organisers hope that an interest in computer games will lead workshop members, many of whom have very little formal education, towards more advanced skills, including programming.

Sinclair Research has offered the two machines at a discount and Centaur Project is hoping for similar generosity from software suppliers. The workshop is at 313–5 Caledonian Road, London N1.

Programs programme

CENTRAL Independent Television is inviting youngsters in the Midlands to join the studio audience for a programme on computers. The six-part series, aimed at seven to 16-year-olds, will be recorded in Birmingham on October 16 and 23 and November 2 and 7.

Applicants have to write describing their micros briefly and for what they use them.

There is a chance to win one on the show. Write, saying in which date you are interested, to Geoffrey Negus, Central Independent Television, Central House, Broad Street, Birmingham B1 2JP.

Sinclair profit is more than £14m

SINCLAIR RESEARCH made a profit of £14.03 million in the year to the end of March, an increase of £5.5 million on the £8.55 million of last year and very close to the forecast given when part of the company was sold to institutional investors in February.

Sir Clive Sinclair said of the result: "For a firm only three-and-a-half years old at the time, the figures are encouraging."

Turnover doubled from £27.17 million to £54.53 million, about £1 million for each person employed directly by the company.

Sinclair saw that as "a testament to the standard of people with whom I am so fortunate to work."

Earnings per share were 207 pence against the previous year's 106 pence but a dividend of only one penny is being paid "because the firm is expanding so rapidly that I believe the interests of the shareholders are best served by internal re-investment of the profits."

Sinclair owns 85 percent of Sinclair Research with another 10 percent owned by a group of institutional investors.

Since the company was formed in 1980 it has sold more than one-and-a-half million personal computers throughout the world. In addition it has an agreement with Timex in the U.S. for selling versions of the ZX-81 and Spectrum, for which it receives a royalty.

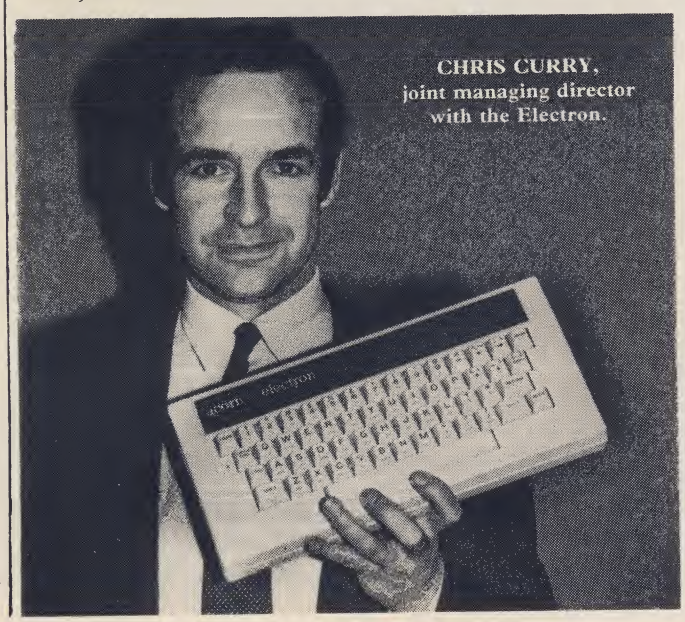
Sinclair said that because of the price war in the U.S., sales in money terms had been much lower than expected. "Fortunately the U.K. market proved better than anticipated, which partly compensated."

For the future, Sinclair said that the company will continue to expand with new products in new areas. One of those areas is the flat-screen television which has been launched recently.

Acorn optimistic at the launch of the Electron

LAUNCHED with a fanfare at the end of August, the latest Acorn product, the Electron, is joining the ZX-81 and the Spectrum, as well as its older brother the BBC micro, on the shelves of 100 branches of W H Smith. It will also be stocked by 300 dealers all over the country.

Selling at £199, the Electron is language-compatible with the BBC and boasts 32K of memory, seven graphic modes, colour and black-and-white TV sockets, and full sound effects. Acornsoft, the Acorn publishing subsidiary, has produced 12 software packages covering games, programming, home education and personal money management.



CHRIS CURRY, joint managing director with the Electron.

"We are confident that the Electron's low-cost, yet BBC-compatible design, will make it an essential part of the home and achieve a prominence equal to that already gained by the BBC micro in the classroom", says Chris Curry, Acorn joint managing director.

The company optimism is reflected in the fact that it aims to produce 100,000 machines by Christmas. Nevertheless, supply is expected to fall short of demand in the early stages and some dealers have already reported waiting lists to around Easter.

Change in ULA hits software

THE ULA change in the model three Spectrum, which was intended originally to combat incompatibilities with Japanese and German television sets, has had unforeseen consequences.

Some people with the new machines are having difficulty loading commercial tapes. The reason is that the machine code IN instruction, which enables tape noise to be read into the computer, has been altered.

"The problem seems to occur when the computer is in graphics mode.

It seems to be a problem with specific, low-distribution tapes and, as far as we know, no Sinclair software or software from our distributors is affected," says Sinclair Research.

Timex Sinclair 1000 sales disappointing

ONE BLOT on the rosy scene of the Sinclair Research financial year was the disappointing performance of the Timex Sinclair 1000 in the U.S. Two factors seem to have affected sales badly, the raging personal computer price war which brought the selling price of the TS 1000 crashing to a derisory $39 and what some believe to have been a marketing error by Timex — the announcement of plans for an upgraded model, the TS 2000, long before it was ready to appear on the market.

In the intervening months, sales of the simpler TS 1000 fell sharply, taking sales of printers and software with them. A Californian distributor reported in August that people were buying one-third as much TS software as they bought for other computers.

Nevertheless, Sinclair Research is not too worried. "It affects us only insofar as royalty payments from Timex have dropped," says a Sinclair Research spokesman. "We are confident the appearance of the TS 1500 and the TS 2000 will help us regain lost ground."

A more handsomely-packaged version of the Spectrum, the TS 2000 is generally agreed to be a winner.

Since its inception in January, prices of other leading computers, such as the Commodore and the Atari, have fallen considerably and it remains to be seen whether the TS 2000 selling price of $200 will prove competitive.

Spectrum Top Ten

	Program	Last Month	Company
1	Flight Simulation	1	Psion
2	Jet Pak	2	Ultimate
3	Mad Martha	3	Mikrogen
4	Horace & The Spiders	6	Melbourne House/Psion
5	Superspy	5	Shepherd
6	Manic Miner	7	Bug-Byte
7	Pssst	—	Ultimate
8	Transylvanian Tower	4	Shepherd
9	Penetrator	—	Melbourne House
10	Ah Diddums	—	Imagine

Compiled by W H Smith.



JUST AROUND THE CORNER, A NEW R



BLACK CRYSTAL

The Classic, six program adventure game for the 48K Spectrum and 16K ZX-81 computers. No software collection is complete without it.

"BLACK CRYSTAL is an excellent graphics adventure and a well thought out package" (Sinclair User, April '83).

"BLACK CRYSTAL has impressed me by its sheer quantity and generally high quality of presentation. I am afraid I have become an addict" (Home Computing Weekly, April '83).

SPECTRUM 48K 180K of program in six parts . . . only £7.50

ZX-81 16K over 100K of program in seven parts . . . only £7.50

Why pay more for less of an adventure?



THE ADVENTURES OF ST. BERNARD

An exciting, fast moving, machine code, arcade game where you guide your intrepid St. Bernard through the perils of the icy wastelands to rescue his Mistress from the clutches of the abominable snowman. £5.95.



THE CRYPT

written by Stephen Renton

Prepare yourself for the many challenges that shall confront you when you dare to enter "THE CRYPT".

You will battle with giant scorpions, Hell spawn, Craners, Pos-Negs and if you are unlucky enough — the Dark Cyclops in this arcade style adventure.

Available now for the 48K Spectrum @ £4.95



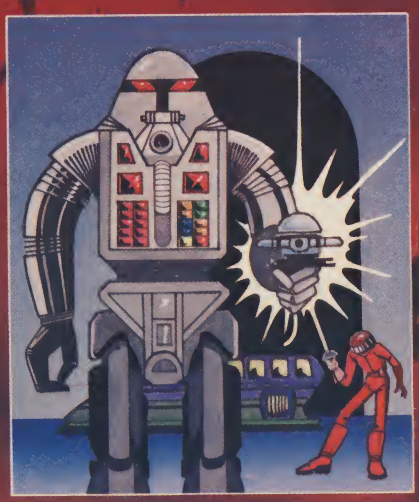
ZX-81 COMPENDIUM

Alien Intruder, Wumpus Adventure, Numerology, Hangman, Hieroglyphics, Movie Mogul.

The ideal software package for all 16K ZX-81 owners. Six major programmes on two cassettes for only £6.50.

"Alien Intruder/Hieroglyphics — Both programs make good use of graphics and words to make a very entertaining package." (Sinclair User, Aug '82)

"Alien/Hieroglyphics/Wumpus/Movie — A varied mix from Carnell, all featuring imaginative responses and graphics and all of them good games for all ages (Hieroglyphics is particularly good for children)." (Popular Computing Weekly, Aug '82)



STARFORCE ONE

Take on the robot guardians of the central computer in a superbly stylised three dimensional battle game. £5.95.

(100% MACHINE CODE ARCADE ACTION)



THE DEVIL RIDES IN

I uttered the last incantations as the clock struck thirteen. All fell silent except for a faint rustling in the corner. From out of the shadows they came, all Hell's fury against me but I was not defenceless until the Angel Of Death, astride a winged horse, joined the battle. Avoiding his bolts of hell fire, I took careful aim. My chances were slim, but if my luck held . . . £5.95.

(Fast moving, machine code, all action, Arcade game)

RANGE FROM CARNELL SOFTWARE



COMING SOON

"THE WRATH OF MAGRA"

The first born has been destroyed. The Black Crystal of Beroth has been banished. The alliance of Evil has been defeated by the armies of Lord Fendal. So ends the Third Age. Now we invite you to write your name in the history of the Fourth Age of the Third Continent.

You will meet friends and enemies, old and new, in the long awaited sequel to Volcanic Dungeon. Using high resolution graphics and combining the best qualities of "Black Crystal" and "Volcanic Dungeon", we will allow you to become part of this tale of revenge.

"The Wrath Of Magra" comes as three, 48K programs on cassette, boxed with instruction manual and book detailing the history of the Third Continent and the many spells you will be using throughout the game.

NOTE: "The Wrath Of Magra" is a complete adventure. You need not buy "Volcanic Dungeon" or "Black Crystal" to play it.

Available through most good computer stores or direct from:
Carnell Software Ltd, North Weylands Industrial Estate, Molesey Road, Hersham, Surrey KT12 3PL.
Dealers: Contact us for your nearest wholesaler.

CARNELL SOFTWARE LTD

AGF

MICRODRIVE C

PROGRAMMABLE JOYSTICK INTERFACE for Spectrum or ZX81

ONLY 32.95 +£1.00pp

NOW AVAILABLE from SELECTED RETAILERS

PROGRAMMABLE INTERFACE

The AGF Programmable Joystick Interface is a unique design offering the use of any Atari-compatible joystick with absolutely all software, whether it is cassette or ROM cartridge, with the Sinclair Spectrum or ZX81.

The hardware programmable interface requires no additional software and accurately replicates the keys of the computer in a manner which is responsive to absolutely *ALL* key reading methods, both BASIC and Machine Code.

The interface does not interfere with key operation and can therefore be used simultaneously with the keyboard.

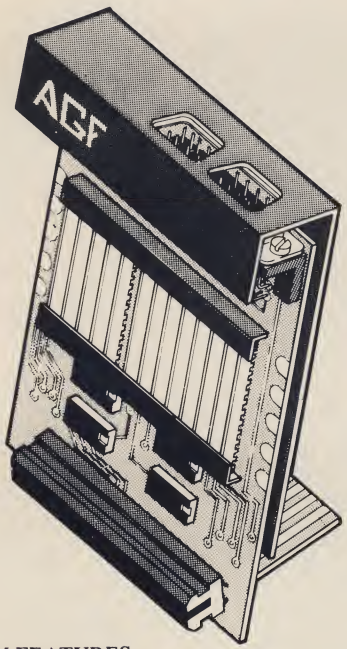
There is no need to remove the interface once fitted as the rear extension connector will accommodate further expansion, i.e printers or RAM packs etc. This important feature avoids excessive wear to the expansion port.

The key replication principle pioneered by AGF means that your own programs can use eight directional joystick movement by utilising simple key reading BASIC.

Two joystick sockets are provided which share the same keys, for use with the majority of two player games. Several interfaces may be used on the same computer for multiple joystick applications.

The interface is programmed by a two digit code, which is looked up on a programming chart supplied, for each direction and firing button. The two numbers are then selected on a pair of leads which are clipped onto appropriately numbered strips on the interface.

Once configured this can be marked on a Quick Reference Programming Card for storing with the game. As the programming is *not* power dependent the interface retains the last configuration made and can be immediately used when next switched on.



KEY FEATURES

- ★ Programmable design gives TOTAL software support.
- ★ Accepts Atari, Competition Pro, Wico, Starfighter, Quick Shot, Le Stick etc.
- ★ Rear extension connector for all other add-ons.
- ★ Free demo program and instructions.

PACKAGE CONTENTS SUPPLIED

- .Programmable Interface Module as illustrated, complete with clip-on programming leads.
- Self adhesive programming chart detailing how to define which key is simulated by UP, DOWN, LEFT, RIGHT, and FIRE. This can be fixed on to the case of your computer or if preferred the protective backing can be left on. The chart is made of a very durable reverse printed plastic and is extremely easy to read.
- One pack of ten Quick Reference Programming Cards for at-a-glance setting to your games requirements. The card allows you to mark the configuration in an easy to read fashion with space to record the software title and company name.
- Video Graffiti demonstration program which is written totally in BASIC to illustrate how all eight directions and fire can be read. This is also a useful high resolution drawing program.
- 12 months guarantee and full written instructions.

JOYSTICKS

CONTROLLERS
FOR USE WITH OUR INTERFACE Module or VIC 20, Commodore 64, Atari VCS, Atari 400, Atari 800

If you require extra Joysticks for our original interface module mark order 'OLD' Joysticks

ONLY £7.54 inc VAT + P&P

PLEASE ALLOW 28 DAYS FOR DELIVERY **ALL ORDERS CONFIRMED**

FROM: MR/MRS/MISS

ADDRESS

SEND C.W.O. (NO STAMP NEEDED) TO: A.G.F. HARDWARE, DEPT.**SU**

FREEPOST, BOGNOR REGIS, WEST SUSSEX, PO22 9BR

QTY	ITEM	ITEM PRICE	TOTAL
	PROGRAMMABLE INTERFACE	33.95	
	JOYSTICK(S)	7.54	
	PACK(S) QUICK REFERENCE CARDS	1.00	
ONE	VIDEO GRAFFITI	FREE	
ZX81 ☐ ZX SPECTRUM ☐ Please tick		FINAL TOTAL	

DEALER ENQUIRIES WELCOME *EXPORT PRICES ON APPLICATION*

COMPATIBILITY

Computer Trade Association Member

JOYSTICK INTERFACE II for Spectrum or ZX81

NEW PRICE

ONLY ~~19.95~~ +£1.00pp 15.95

JOYSTICK INTERFACE

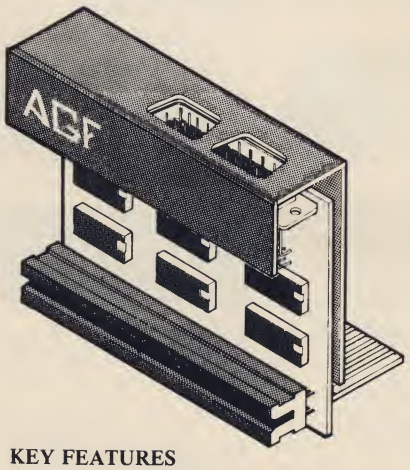
The Interface Module II has been specially designed to plug on to the rear connector of your ZX Spectrum or ZX81 and allow you to connect any standard Atari type digital Joysticks. All of the computer's connections are duplicated on an extension connector so that you can still use any other devices intended for use with your computer.

The Interface Module II resides in the same memory space as the keyboard, which remains fully functional at all times, therefore it will not interfere with anything else connected.

When a suitable joystick is plugged into 'Player 1' socket its action will mimic pressing the cursor keys, up "7", left "5" and so on. The firing button will simulate key ϕ. This unique feature guarantees the best software support.

Take a look at the selection of compatible games we have listed. More are being added all the time as a result of our contact with the various software companies.

A second Joystick may be connected in the 'Player 2' position which simulates in a parallel fashion keys T-Y-U-I-P. This will allow you to play a whole new generation of two player games.



KEY FEATURES

- ★ Proven cursor key simulation for maximum software support
- ★ Accepts Atari, Competition Pro, Wico, Starfighter, Le Stick, etc Joysticks
- ★ Second Joystick facility
- ★ Eight directions programmed in simple BASIC

COMPATIBILITY CASSETTES ☐ £4.95

These cassettes have short programs to load before the chosen game which will convert it to use the cursor keys and therefore become compatible with the Interface Module II.

Cassette One converts:

ARCADIA
SCHIZOIDS
HUNGRY HORACE
HORACE GOES SKIING
SPECTRES
PENETRATOR

NEW!

Cassette Two converts:

CENTIPEDE
PLANETOIDS
JET-PAC
† PSSST
† 3D COMBAT ZONE
† INVADERS

† Will require 48K Memory

JOYSTICKS

CONTROLLERS FOR USE WITH OUR INTERFACE Module II or VIC 20, Commodore 64, Atari VCS, Atari 400, Atari 800

If you require extra Joysticks for our original interface module mark order 'OLD' Joysticks

ONLY £7.54 inc VAT + P&P

☐ *Available from us*

** State "AGF version"*

JOYSTICK INTERFACE II COMPATIBLE SOFTWARE

ZX SPECTRUM

Abbex	*	Spookyman	
	*	Invasion	
	*	Harrier	
	*	Cosmos	
	*	The Android Run	
	*	High Noon	
	*	ETX	
Abersoft		Mazeman	
		The Wizards	
		Warriors	
		Spectroid Storm	
Apocolypse Software	☐	Galactic Jailbreak	£4.95
Axis		Labyrinth	
Blaby		Confusion	
		Chopper Rescue	
		Gold Digger	
Campbell Systems		Gulpman	
CDS Micro Systems		Leapfrog	
C. Tech		Specman	
Digital Integration		Night Gunner	
		Fighter Pilot	
D.J.L. Software		Froggy	
DK 'Tronics	☐	3D Tanx	£4.95
		Meteoroids	
Hewson Consultants		Nightflite	
		Specvaders	
		Mazechase	
ICL		Star Trail (Man.Dock)	
Imagine		Zzoom	
Megadodo Software		Pheenix	
Micromania		Ghost's Revenge	
New Generation Software	☐	Escape	£4.95
	☐	3D Tunnel	£5.95
	☐	Knot in 3D	£5.95
Newsoft Products		Time Bandits	
		Spectral Maze	
Psion		VU–3D	
		Flight Simulation	
Quest		Violent Universe	
Quicksilva		Meteor Storm	
		Space Intruders	
R + R Software		Gnasher	
		Spectipede	
Richard Sheppard		Trans. Tower	
Silversoft		Ground Attack	
	☐	Cyber Rats	£5.95
Vectis Software		Pony Express	
		Vec-Man	

PLEASE ALLOW 28 DAYS FOR DELIVERY

ALL ORDERS CONFIRMED

FROM: MR/MRS/MISS

ADDRESS

SEND C.W.O. (NO STAMP NEEDED) TO: A.G.F. HARDWARE, DEPT.SU

FREEPOST, BOGNOR REGIS, WEST SUSSEX, PO22 9BR

QTY	ITEM	ITEM PRICE	TOTAL
	INTERFACE MODULE II	16.95	
	JOYSTICK(S)	7.54	
	SOFTWARE:		
	SOFTWARE:		
		FINAL TOTAL	

ZX81 ☐ ZX SPECTRUM ☐ Please tick

DEALER ENQUIRIES WELCOME *EXPORT PRICES ON APPLICATION*

"BY FAR AND AWAY THE BEST MAIL ORDER FIRM FOR SOFTWARE"

(M. PANKHURST, Cranleigh)

SOFTWARE SUPERMARKET

Our catalogue does not have the biggest list of Spectrum programs, just the best. About 50, in fact, covering all fields. (We produce no programs ourselves, so our choice is impartial).

We play all the programs we can find and put just the best of each type into our 24-page catalogue. We quote reviews from *all* the mags and even tell you if your joystick will work!

We choose the best and send them fast. From over 40 countries you praise our same-day despatch. Mail order or phone VISA card orders only please. We're too busy testing programs to run a shop! All goods in stock – and personally tested by us – before a word appears in print!

48K SPECTRUM ONLY

SPLAT! Brilliant, original game from a new company. Guide Zippy through rapidly scrolling mazes, explore, survive, eat grass – and don't get splatted! **£500 HI-SCORE COMPETITION.** Find the Codewords, closes 14/1/84. 7 levels: JOYSTIX: Kempston, AGF. (Incentive) £5.50.

ZZOOM *"Superbly done . . . an outstanding piece of software which is somewhere between a flight simulation and 3D Defender"* (Pers.Comp.News). Fantastic 3D realism as you pilot your ground skimmer to save the refugees from the enemy's planes, tanks, submarines – and Exotron missiles. Raves everywhere. (Imaging) £5.50.

KONG The best Spectrum 'Kong' we've found – it's magic! 4 screens: rolling barrels, fireballs, flying dumbbells, moving lifts – and a pretty girl shrieks "Help!" Demo. Training mode for each screen. Hall of Fame. One of the great games. JOYSTIX: Kempston, Quickshot, Protek. (Ocean) £5.90.

PARAS New full-screen graphic battle game: NOT an arcade or adventure game. You have 15 men to destroy the bridge. Each man has 10 possible actions each turn. 10 skill levels. 2-part game – secure your retreat, then destroy the bridge. (Lothlorien) £5.95.

XADOM *"Excellent 3D graphics . . . very friendly . . . five stars".* (Home:Comp:Wkly). An arcade/adventure combo with great 3D graphics. Explore the alien base to find the "Aartifact" – avoiding the aliens, the traps, the snakes etc. 3 speeds and 3 skill levels. Very good help pages and instructions. (Quicksilva) £6.95.

MANIC MINER *"One of the best Spectrum releases this year".* (Pop:Comp:Wkly) *"The graphics and sound are both superb".* (Pers:Comp:News) Based on the USA arcade chart-topper 'Miner 2049'er': great music, superb graphics as you search through 20 screens – each one a different arcade game. Amazing! 20-screen demo mode. JOYSTIX: Kempston. (Bug-Byte) £5.95.

THE HOBBIT *"Superior to any other adventure game available".* (Yr Comp) *"Takes first place . . . for quality and value for money".* (S. User) THE Spectrum adventure of 1983. Free 285-page illustrated book with clues: unique real-time adventure: 80 locations, 30 beautiful full-screen pictures: 500-word vocab: 16-page manual: 40K of program to 4 people 18 months to write! (Melbourne) £14.95.

PIMANIA *"The best adventure game we have reviewed".* (S. User) *This game can damage your brain".* (Pers:Comp:Games) At press-date, you can still win the £6,000 Golden Sundial by solving this wonderfully witty adventure! Brilliant use of music and graphics really shows off your Spectrum. (Automata) £10.00.

BLACK CRYSTAL *"Excellent graphics adventure".* (S. User). 180K of program loads from 2 cassettes in 6 chapters. Solve each of the 6 stages to defeat the Lords of Chaos. Real-time monster battles: 16 command keys. Illustrated manual. (Carnell) £7.50.

ANY SPECTRUM

PHEENIX BRAND NEW – THE BEST SPECTRUM 'PHOENIX' YET! A full arcade-action 5 screens. 5 skill levels. Choice of 2 character sets. Demo mode. 100% machine-code for smooth animation of the multi-coloured flappers and their hatching eggs. Crams 48K quality into 16K. JOYSTIX: Kempston: AGF (Megadodo) £5.50.

3D SPACE WARS Brilliant 3D space battle. Demo mode: good, clear screen display of instruments: cockpit view fills 2/3rds of screen. Long-range scanner is actually legible! Re-fuelling in space is great. Defeat the 3D SEIDDAB (geddit?). Great space-flight simulation from a company famous for earthflight simulations! JOYSTIX: Kempston: AFG (Hewson) £5.95.

ARCADE SAMPLER Three machine-code classic greats on one tape! INVADERS – one of the fastest ever – 3 speeds, 7 rows of invaders, saucer, shield, 5 bases! SCRAMBLE with 8-way movement, good graphics, and a very fast program. HIGH NOON, the great shootout. For 1 or 2 players. 3 skill levels, nice smooth graphics. (Work Force) £6.50.

POOL The very best Spectrum Pool we've ever seen. Beautiful full-screen table: 1 or 2 players: on-screen frame, balls left, shots, speed select, direction, score, hi-score. Sensational graphics and great sound. (CDS) £5.95.

JET-PAC *"A classic which should rank with Space Invaders and Pacman".* (Pers:Comp:News) *The graphics are superb".* (C&VG) The fantastic game that blasted Ultimate to fame. Control your test-pilot spaceman as he builds his rocket, fuels it up, explores galaxies. 1 or 2 players. As good as its rave reviews. JOYSTIX; Kempston: Quickshot. (Ultimate) £5.50.

FROGGY *"The game is superb"* (ZX Comp) *"Unreservedly recommended . . . a stunning display".* (Home Comp:Wkly) This frogger is leaps ahead of the rest! Loads in 2 parts: instructions and keyboard demo first, then the game – which uses so much memory you even have to unplug your printer! A classic game, in its very best form. JOYSTIX: Kempston: Quickshot (DJL) £5.95.

E.T.X. *"Must be at the limit of the Spectrum's capabilities . . . graphics are excellent and animation superb".* (Home Comp:Wkly) Enchanting adventure: 16 full-screen scenes: 1400 power zones: 4 skill levels. And, in 48K, ETX speakes to you as well! JOYSTIX: Kempston: AGF: Quickshot (Abbes) £5.95.

FREE KEYBOARD OVERLAYS!

If you order from this advertisement comes to £25 or more *(excluding* p&p) we will send you a set of ten of our specially printed keyboard overlays. (If you would like to buy them, they cost £2.50 a set). These overlays will help you get the most from the complex new games!

CALL 01-789 8546 (24 hours)
CHARGE PROGRAMS TO ANY VISA CARD
FREE ZX81/BBC 32K CATALOGUES, TOO!

To: SOFTWARE SUPERMARKET,
87 Howard's Lane, London, SW15 6NU, England.

If you do not want to cut this magazine, write your order out carefully on plain paper and quote this number: **SU12**

I own a 16K/48K Spectrum. (Delete one). I enclose a cheque/PO made payable to Software Supermarket. OR Charge my VISA card no.

☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

Signature

Please write clearly. If we can't read it, you won't get it.

Name

Address

.....

..... Postcode

Phone, if any, in case of query

Program Name	Computer	Price
		£
		£
		£
		£
		£
		£
POSTAGE AND PACKING	U.K. Add 55p only per order	£0.55p
	EUROPE. Add 55p for each program	£
	OUTSIDE EUROPE. Add £1 for each program airmail	£
OUTSIDE EUROPE PLEASE ADD £1 EXTRA FOR REGISTERED MAIL	TOTAL	£

Diet challenge gains weight

WE ARE WRITING concerning your review of Dietron in the September issue. The review is of particular interest because we produce Diet Master for the 48K Spectrum, a copy of which you have had for review for some time. We bought Dietron originally and experienced the same crash and errors you experienced, so we felt we could produce something better, hence Diet Master.

One of your criticisms of Dietron reflects some of the comments made to us about our program, i.e., it is supposedly far easier to obtain nutritional information from a book rather than to spend time loading the program and running it. That may be so for a qualified dietician but not for anyone else.

So we would like to issue a challenge to people with 48K Spectrums. If anyone can produce the information provided in our program in a shorter time than our program, including loading, we will remove our program from the market.

We will provide the appropriate nutritional books. What the user must do is to write a personal RDA table based on occupational category, sex and age; construct an accurate weight-range graph, based on height, weight and frame size; for everything which has been eaten in a particular day they must provide accurate figures on eight different nutritional compositions for each food, including things like sugar and milk; and, finally, they must construct a histogram for each of the nutrients in our program, showing the recommended RDA figure against what has been consumed of that nutrient, and give a percentage.

If anybody can produce all that information in a shorter time than our program can we will keep our promise and withdraw ours from the market. As a guideline, for an average day's eating it takes approximately 20 minutes to do this with Diet Master. This may seem a trivial point but if you can publish the challenge, perhaps we can dispel your, and many other people's belief that doing it from a book is quicker.

Also, a diet program, although obviously of use to anyone slimming, is designed primarily to provide a balanced intake of food. Your over-emphasis on the slimming headline — Dietron lacks weight in the slimming business — is misguiding as to what a diet program is there to do.

Laurie Sinnett & Louise Buckle, Delta 7 Software, Leeds.

Classified directory

CONGRATULATIONS on a very well-presented magazine. The Software Directory is an excellent idea and should be continued in future issues. Why not put a list of ZX-81 games in one issue and in another issue the Spectrum list? That way one full list of games for each computer can be published in one issue.

Another good idea would be to put the list of games into subheadings, such as Adventure, Arcade, Business. That way, if one wants an adventure game he would have to look only under that subheading instead of looking through the whole list.

Farley Scollick, Egham, Surrey.

Random access

PERHAPS 16K Spectrum owners would like to try the following RANDOMIZE USR commands:

RANDOMIZE USR 1000→1012
RANDOMIZE USR 1331→1332
RANDOMIZE USR 3000
RANDOMIZE USR 4000
RANDOMIZE USR 9000
and LIST.

Has anyone beaten my Orbiter high score? — 1,550,450. It took me seven hours and I stopped only when cramp in my fingers set in.

Lee Overy, Mynydd, Isa, Nr Mold, Clwyd.

Notable notemaker

I HAVE just typed-in Notemaker — Program Printout, July, 1983 — by R Frost. I found it a most useful and interesting program which has made it easier for me to create tunes on my Spectrum. When a tune is played back, however, the music is very jerky and not always recognisable.

There is a simple solution which needs no extra lines added. When you press "m" to play back, press two keys e.g., "n" and "m" alternately, and the music flows, eliminating the gaps between notes. Press the key just as the note is finishing to obtain the best effect.

I enjoy your magazine very much and have bought every issue since I bought my computer a year ago.

Matthew Ashton, Bury, Lancs.

Spellings of the world

THANK YOU for your favourable review of our Countries of the World cassette for the Spectrum. We are working hard to produce original software for the new generation of colour computers and I think you will agree that in this case we have succeeded.

Unfortunately, your reviewer closed his remarks by disputing our spelling of the capital of Andorra. Even more unfortunately he stated "little mistakes like that spoil the program".

Such global criticism is ill-judged and unfair. We undertook a great deal of research into the names, capitals, languages, currencies of all the 170 or so Countries of the World, using a number of reference books before we launched the cassette and we stand by our data as being accurate.

Your reviewer is clearly not aware that many countries have more than one national language and more than one accepted spelling for the names of the capital. Andorra is a case in point. It is a small state on the border of France and Spain and dialects of French and Spanish are the main languages.

The various reference books contain three versions for the name of the capital as *Andorra-la-Vella* — Philips Illustrated Atlas, Philips International Atlas and the Times Concise Atlas; *Andorra-la-Vieille* — Statesman Year Book; *Andorra-la-Vieja* — The Times Atlas. The Hamlyn World Atlas and the New Oxford Atlas give the name of the capital simply as *Andorra.* We chose the second version and your reviewer prefers the first.

There is no space in the Spectrum RAM to permit us to give alternative spelling for capitals although we are able to give all the main languages and currencies. I therefore feel that we are offering an excellent product which is good value for money.

Andrew Hewson, Hewson Consultants, Wallingford, Oxon.

Quality does not impress

I AM writing as I believe readers may be interested in my experiences with Sinclair computers. Two weeks ago I bought a ZX-81 from Currys electrical store in Bristol. Encouraged by favourable reviews I had read in various computer magazines, including yours, and also the large amount of software available and the reasonable price, I considered it a good buy.

Unfortunately after three days of endless trying and frustration attempting to get the computer to accept programs either from tape or by typing them in, I concluded I had bought a dud. Although a little fed up at having spent three days establishing that the computer did not work properly I returned it to the shop.

While I was there I met another customer who had had two ZX-81s, both of which had not worked properly. Currys, unable to supply a replacement, gave me my money back and, undaunted by this experience, I had enough faith to buy another ZX-81 from Currys at Bedminster.

Again I returned home excited by the prospect of at last experiencing the joys of home computing. Again the computer did not work properly and had to be returned.

Although disappointed by this episode, I ascribed it to bad luck and decided to pay a little more to get a better-quality computer which would prove more reliable. Thus a week later, having again looked through the reviews in computing magazines and at the availability of software for different computers, I bought a Spectrum 48K computer.

As with the other two computers the Spectrum did not work properly, refusing to accept programs.

At that point I started to get a little angry and upset. Back went the computer to W H Smith where I had bought it. While I was there another customer was taking back a ZX-81 which had gone wrong. Amazingly it was his fifth which had gone wrong or had failed to work in a week.

When my first computer refused to work, initially I blamed my tape-recorder, as I know that some are not compatible with home computers and tested that by going to W H Smith, with a demonstration model which was on display running a program on it. It worked perfectly.

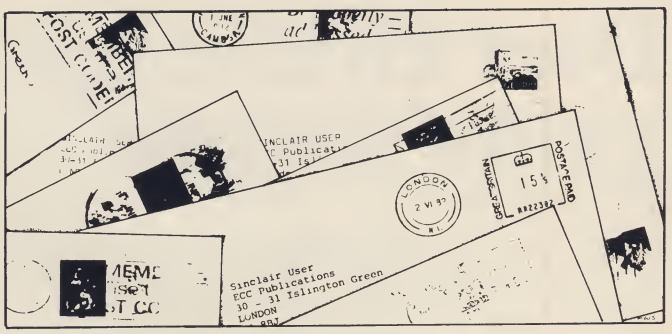
Again with the Spectrum initially I blamed the tape recorder. Again I tested it by taking it to the ZX Centre in Gloucester Road, Bristol, which sells software for Sinclair computers. Again the tape recorder loaded a Spectrum with a program.

This saga of Sinclair computers going wrong seems difficult to stomach and I wonder how Sinclair earned its reputation of being reliable? I am now at a loss what to do.

I would like to have a Spectrum which works to gain access to its unrivalled software and hardware add-ons but I do not think I could go through the ordeal of buying another, only to find it break down yet again and have the trouble and effort of taking it back.

I would like to own a home computer but my recent foray with Sinclair has given me grave doubts about which one I should now buy.

Christopher Watkins, Bristol.



Corrections on account

THANK YOU for your review of my Bank Account system for the Spectrum in *Sinclair User*. The date validation problem has now been corrected.

It may be of interest to readers that I am also marketing a Diary System written to the same standards as Bank Account for £3.

Also now an enhanced version of Bank Account is available for £4.

This version allows all transactions to be analysed by user-defined codes.

Keep up the good work, *Sinclair User*.

K J Gouldstone, Wallington, Surrey.

Speeding command

I HAVE HAD a 16K ZX-81 for eight months. I have discovered a poke which speeds some commands dramatically. It is Poke 16389,76. To prove the speed type:

SLOW Program 1.
POKE 16389,76
5 SLAVE " "
RUN

Note how long it takes to run, then pull out the mains plug — for the ZX-81 — for about a second, put it back in again and type:

5 SLAVE " " Program 2.
RUN

You will see that Program 1 works much faster than Program 2. Then type:

POKE 16389,76
NEW

See how quickly it did it. It has a host of other uses, including clearing screens which have been scrolled instantly.

It has the disadvantage that graphics can wobble. My RAM pack is a Sinclair and I am not sure if it will work on other makes such as a Memotech.

Edward Wright (aged 12), Rochdale.

Patience needed

THE PATIENCE program by Andrew Price in the September issue does not work. That is due to values not being defined in the array DIM N(7) in line 15.

It can be rectified by the addition of a single line:

'50 FOR X=1 TO 7 : LET N(X)=5 : NEXT X'

S Wilson, Ardmore, Co. Derry.

Rotating plotter

WHILE experimenting with my 16K Spectrum, I discovered that typing:

PLOT 128,88
DRAW 30,30 4E4

draws a shape and rotates it. Changing the third number in the DRAW statements changes the shape and size of the object. Also typing RANDOMIZE USR 3280 scrolls the screen up one character. This is the Spectrum ROM routine for scroll.

Neil Durant, Selby, N. Yorks.

Are You A SOFTEK VIDWIZ? Send in your highest score!

STARGATE is closing in!

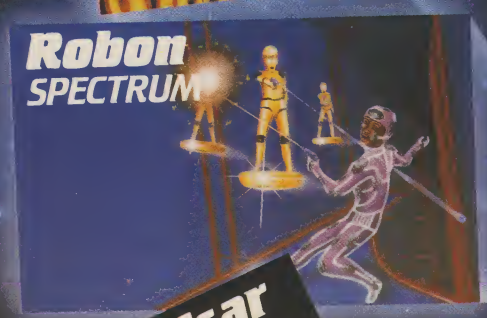
SOFTEK

Masters of The Game



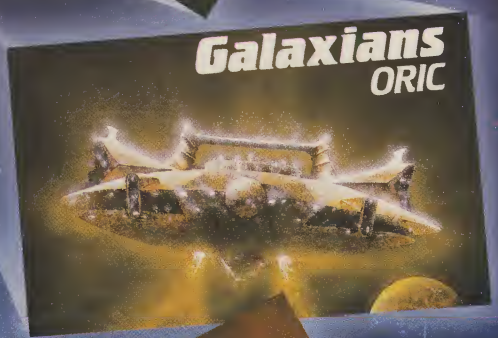














WATCH THIS SPACE

Games for
SPECTRUM
ORIC
DRAGON
BBC 2
CBM 64
ELECTRON
Coming Soon



Softek software for the Spectrum. Dragon and Oric should be available in most major outlets such as W. H. Smith, Lasky's, Spectrum and selected branches of Menzies as well as through our nationwide dealer network. Alternatively fill out this coupon and we'll rush you your Softek game by return of post!

WARNING! All programs are sold according to Softek's terms of trade and conditions of sale. Copies of which are available on request.

All Softek software comes with a perpetual guarantee. Should it ever fail to load return it for a replacement. If the tape shows signs of physical damage then please enclose £1.50 to cover costs.

GSH
Guild of Software Heroes

SOFTEK SOFTWARE
12/13 HENRIETTA STREET, LONDON WC2
Tel: 01-240 1422

SPECTRUM GAMES:

OSTRON	☐ £5.95		
FIREBIRDS	☐ £5.95		
ROBON	☐ £5.95	**ORIC GAMES:**	
REPULSAR	☐ £5.95	GALAXIANS	☐ £6.95
MEGAPEDE	☐ £5.95	SUPER METEORS	☐ £6.95
MONSTERS IN HELL	☐ £5.95	**DRAGON 32:** MONSTERS	☐ £6.95

Please send me the games as ticked

Total cheque/P.O. enclosed £___:___ payable to 'SOFTEK'

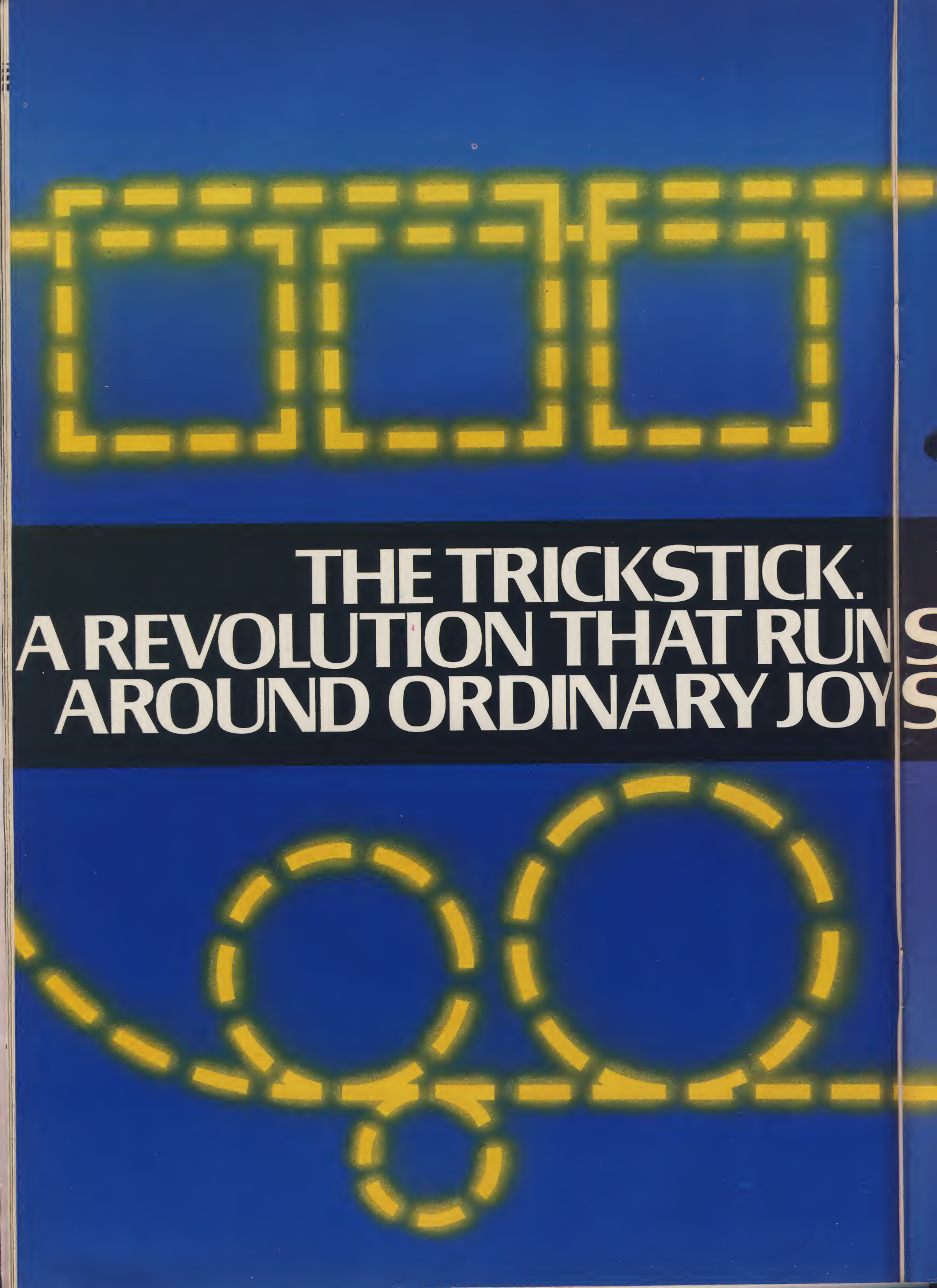
PLEASE SEND ME A CATALOGUE ☐
PLEASE SEND ME DETAILS OF 'SOFSYS' YOUR HIGHLY ACCLAIMED UTILITIES FOR THE SPECTRUM ☐

NAME

ADDRESS

.....

SOFTEK SOFTWARE
12/13 HENRIETTA STREET, LONDON WC2


THE TRICKSTICK.
A REVOLUTION THAT RUNS
AROUND ORDINARY JOYS



NS RINGS
YSTICKS.

You know what it's like when there's someone closing in fast and your joystick won't do what your brain wants it to.

It won't let you loop or curve the way you'd like, or arc and spin at the speed you want.

You can't get away quick enough, so what happens? ZAP!

For just £28.00 (+ postage), the Trickstick responds at the speed of light.

With its revolutionary light sensitive controls and own interface, the Trickstick lets you go where you want, at the speed you want.

Not just up and down or side to side, but round and round in any sized curve or loop you need to build up really big scores.

And the Trickstick is easy to use. All you do is pass your thumb or fingers over the controls and your craft responds.

Immediately.

And because the only moving parts are the firing buttons, the new Trickstick will last far longer than old fashioned joysticks.

Best of all, for £28.00 (+ postage), you get a Trickstick, a special training program and a chance to enter The National Trickstick Championships.

Up to eight people can play simultaneously.

For the very first time, you can now play with up to seven of your mates.

With our specially written game, you can either play against the computer, against one friend, in teams of two or three or however you want.

Just by plugging in extra interfaces to each other, up to eight of you can loop the loop and battle it out. All at the same time.

So if you thought computer games were already exciting, wait until you get your hands on a Trickstick.

Revolutionary new software.

Developed especially for use with the Sinclair ZX Spectrum and fully compatible with standard Kempston software, the Trickstick makes your existing software even more fun.

But because it's so revolutionary, it's actually made possible a whole new generation of software.

The first of this new generation is Attaktics, a brand new game which really brings out the full potential of the Trickstick and is available for only £7.50 when you buy your Trickstick.

So fill in the coupon now. And start running rings around your mates before they start running rings around you.

Please send me (state number required):–

☐ Trickstick/s with training cassette at £28 each £_____ ☐ Attaktics at £7.50 (with each Trickstick) £_____ ☐ Attaktics at £10.00 (without Trickstick) £_____

Postage 65p. I enclose Cheque/P.O. for £_____ made payable to East London Robotics Ltd.

My Access ☐ Visa ☐ is ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

NAME _____ ADDRESS _____ SU1

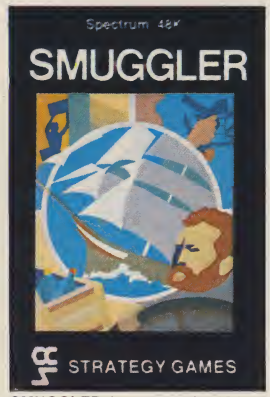
Please send to: East London Robotics Ltd., Gate 11, Royal Albert Dock, London E16. 24 Hour information service: 01-471 3308. 24 Hour Access/Visa ordering: 01-474 4715. Special enquiries: 01-474 4430 (Telex: 8813271).

EAST LONDON ROBOTICS

PLANE SAILING



AIRLINE A wing and a prayer will not be enough to turn your £3 million to £30 million in the time allowed, but your financial wizardry will enable you to take over British Airways, or will it? Runs on ZX81 16K — £5 and Spectrum 16K/48K — £6.



SMUGGLER As master of a 19th century vessel you plough between England and the continent visiting ports to buy and sell your cargo, but beware the customs men, pirates and gale force winds can all run you aground. Runs on Spectrum 48K — £6.



PLUNDER Can you singe the King of Spain's beard. Engage the Spanish ships on the high seas survive their broadsides and plunder the gold destined for the Armada and you might get your Knighthood before Francis Drake. Runs on Spectrum 48K — £6.



ABYSS Can you journey across the long-forgotten Abyss and outwit the evil monsters that lurk in the shadows awaiting the foolhardy and careless adventurer. There are many bridges and many monsters. Will you be the one to make the Abyss safe to cross again. Runs on Spectrum 48K — £5.



CORN CROPPER Limited cash and droughts are two of the problems facing the farmer. Planting fertilizing and harvesting must all be done economically if you are to reap the rewards offered in corn cropper. Runs on ZX81 16K — £5 and Spectrum 16K/48K — £6.



DALLAS Can you amass enough petro dollars to take over the Euing empire. Cut throat business and an eye for the main chance may get you there but you'll need nerves of steel to become the oil king of Dallas. Runs on ZX81 16K — £5 and Spectrum 16K/48K — £6.



GANGSTER Are you cold hearted and callous enough to warrant the title of Don. You need to be if you are to rise to the top of the pile. A quick trigger finger and an even quicker brain are needed to control the mobs and their rackets. Runs on Spectrum 48K — £6.



BYTE Complete the ten circuits you need to build your computer system then return home. Easy. Byte has sent its electronic monsters to harry you through this three dimensional maze of circuitry, if any of them catch you . . . Runs on Spectrum 48K — £5.



AUTOCHEF You have a million in capital and need to increase this to £25 million in the shortest time possible. Inflation, strikes, sluggish markets are only some of the hazards to overcome. Runs on ZX81 16K — £5 and Spectrum 16K/48K — £6.



PRINT SHOP In print shop are scheduling, staffing, purchasing and quoting within this time limit will test your business acumen to the full and weekly balance sheets will prove the quality of your decision making. Runs on ZX81 16K — £5 and Spectrum 16K/48K — £6.



BRITISH LOWLAND You are given a racing start for your small sports car company but you have an overdraft to repay and a workforce to be kept happy. Steer your way to success with careful management and industrial relations. Runs on Spectrum 48K — £6.



CAMELOT As the banished Arthur Pendragon you must find seven treasures without falling prey to the Brigands, Dragons and Evil Magicians that stand in your way and make a triumphant return to Camelot to be crowned King. Runs on Spectrum 48K — £5.

Available from W H Smith, Boots, Rumbelows and all good computer shops or Cases Computer Simulations Ltd., 14 Langton Way, London SE3 7TL.

Strategy Games. They're no pushover

Fuller puts all its eggs in one basket

THE FULLER BOX is an extension which looks natural to the back of a Spectrum. It contains a sound board, amplifier, joystick port and separate cassette EAR and MIC sockets.

The sound board contains the AY-3-8912 sound chip used in many computers and has three programmable pitch tone supplies, plus a noise generator. It also has envelope control to give rising or falling pitched sounds.

The sound board works on port numbers 63 and 95, while the joystick works on port 127. The joystick socket is the standard Atari one and besides the demonstration cassette some commercial software will also work with it, as it is similar to the Kempston joystick.

It costs £30.75 for the basic unit — called the Fuller Box — and the master unit costs £55.75, which includes the speech chip. You can if you wish upgrade to the speech chip at a later date. Fuller Micro Systems, The ZX Centre, Sweeting Street, Liverpool 2. Tel: 051-236 6109. Other shops sell the units.



Easy-to-use double Spectrum interface

MOREX has produced a Centronics and a proper RS232 interface for the Spectrum. Both are contained in a small black box which plugs into the back of the Spectrum. Only 850 bytes of machine code are required to operate the interface and it is located below the USR-definable graphics section of the 16K or 48K RAM — both versions are supplied on the same tape.

Both interfaces will operate via the LLIST and LPRINT commands once a call to the machine code has been made via the USR command. The RS232 will also allow INKEY$ from an RS232 device. The code sent can either be all codes from 0 to 255 or they can be sent as TEXT which would normally appear on the screen.

Various speeds can be set on the RS232 to a maximum of 600 baud on a 16K machine — it can be set higher but the manual warns it can be unreliable — or 4,800 baud on the 48K. The baud rate cannot be split, to work Prestel for instance, at 1,200 one way and 75 the other.

The RS232 has the same handshaking as most professional devices — CTS, RTS and TX, RX data — on a 7-pin DIN socket. No plug is supplied.

The only difficulty was finding some device with which to try it. It will not work with non-standard devices as it requires a negative voltage to register as the LOW condition. With a BBC Micro Model B it worked very well; as the BBC allows the RS232 to act as the keyboard, the whole machine could be controlled from the Spectrum, which should be very useful for schools.

The RS232 is also a both-way device, so PRINT statements and programs can be fed into the Spectrum as well. It is simple to use and very well-documented in the manual supplied, including a list of system variables for machine code users.

The Centronics interface has a 26-way IDC connector — the same type as the BBC — so there should be no difficulty in obtaining a printer cable. A graphics tape is also included for Seikosha, NEC or Epson printers to permit a screen COPY to be done in two sizes — but not using the COPY command.

The edge connector is also extended through to the back for any other add-ons and the port addresses used are 254 and 127.

The Morex interface costs £45.95 from Morex Peripherals Ltd. An RS232 lead to a 25 D-plug costs £13.45. It will also work with a version of Tasword-2, the Spectrum word processor.

Unit cuts loading errors

THE ELINCA ZX Tapeloader is a box which contains all the elements to clean doubtful tapes and to ensure perfect SAVEing and LOADing of programs. The black box contains a small meter with which to set the level of the input from the tape recorder, a three-position switch for selecting SAVE and LOAD, and two tape filters. It also has a red LED to indicate what mode it is in.

The LOAD amplifier keeps the signal constant and filters-out noise caused by the pening the signal. The SAVE filter is a passive — non-powered — one which eliminates noise.

The unit has two jack sockets in one side and two leads from the other to plug into the EAR and MIC sockets of the computer. It is not necessary to keep unplugging the leads with the unit on SAVEing and LOADing. The unit is powered by a PP3 battery which has to be fitted inside the unit by the user — it is not supplied. It works very well and having a meter on it makes it easy to set up.

The unit is guaranteed for one year and may be returned within seven days for a refund if you are not satisfied.

Elinca Products Ltd, Lyon Works, Chapel Street, Sheffield, priced at £14.99.


H·U·P·G
HIGH LEVEL USER FRIENDLY
REAL TIME GAMES DESIGNER
M
ALL YOU NEED
IS IMAGINATION

N·O·W...

THE GAMES YOU IMAGINE CAN BE THE GAMES YOU PLAY

DESIGN YOUR OWN COMPUTER GAMES IN MINUTES

Introducing the incredible H.U.R.G. — The ultimate game program for people who want to really play games. With H.U.R.G. the hardest thing you will have to do is to think of a game title, and design the characters.

HIGH LEVEL — requires no programming skills — simply design the shapes you want, and H.U.R.G. will animate them into the most amazing on-screen action you've ever seen. Choose any setting for your game, from mazes to outer space or sinister caverns — the only limit is your imagination.

USER FRIENDLY — H.U.R.G. will lead you through a series of easy to follow procedures, ending in the creation of a game that is as wild as your imagination!

REAL TIME — You can see exactly what you're creating at all times. Every game has hundreds of variations, and you can change its features at any time. You can speed up the action, change the size of the characters and even make them more vicious — it's all up to you; and you can see it all on-screen immediately.

GAMES DESIGNER — H.U.R.G. enables you to design and store the games you create on cassette and play them later using H.U.R.G. as the control program. It's the one program you will never tire of.

Now you can create all the stunning arcade effects that up until now have only been available to professional software houses.

BONUS

To really fire your imagination, H.U.R.G. includes three ready-to-play fast-action arcade games, created using H.U.R.G.

Design a Game... WIN £3,000

Each month up until January 1984, three prizes will be awarded every month for the best games of the month

At the end, the best game will win a grand prize of £3,000

YOU could be a famous games designer! Every entrant has the opportunity of being published by Melbourne House and earning royalties.

Details of the competition are available with H.U.R.G.

Orders to
Melbourne House
131 Trafalgar Rd,
Greenwich,
London SE10

Correspondence to
Melbourne House
Church Yard
Tring, Hertfordshire HP23 5LU
Trade enquiries welcome

☐ Please send me your free 48 page catalogue.

48K SPECTRUM Cassettes

☐	H.U.R.G.	£14.95
☐	The Hobbit	£14.95
☐	Penetrator	£6.95
☐	Terror-Daktil 4D	£6.95
☐	Melbourne Draw	£8.95
☐	Computer Bridge	£8.95
☐	Abersoft Forth	£14.95

£

£ 80

TOTAL £

I enclose my ☐ cheque ☐ money order for £

Please debit my Access card No.

.....

Expiry Date Signature

Name

Address

.....

..... Postcode

SU 11.83

H.U.R.G. will be officially released at the end of October. Get your order in now, and reserve your copy so that you can be among the first with this revolutionary software!
Access orders can be telephoned through on our 24-hour ansafone (01) 858 7397.

Melbourne House

Interesting addition

KELWOOD COMPUTER Cases has produced a powerful amplifier for the Spectrum to amplify games and keyboard beeps. It is contained in a plastic box only $4\frac{1}{2} \times 2\frac{1}{2} \times 1\frac{3}{4}$in. and contains a one-chip amplifier based on the LM380 chip.

It has a power ON/OFF switch, volume control and loudspeaker built-in and it runs off a single 9V PP3-type battery, which is included in the price.

It should improve most graphics games which have sound and make them more interesting.

A version of the amplifier can also be obtained built into the company's power base module — a metal sloping stand with power ON/OFF and tape LOAD-SAVE switch. It is called the Sound Power Base. It requires no battery as it is driven from the Spectrum power supply.

The Supersound Spec-amp costs £7 and the Sound Power Base £19.95 or £17.70 from Kelwood Computer Cases, Downs Row, Moorgate, Rotherham S60 2HD. Tel: 0709-63242.

Low-cost briefcase

A HARD green plastic briefcase which can be used for a Spectrum costs only £3.99 at W H Smith. It is intended for children going to school and is approximately $15 \times 11 \times 3\frac{1}{4}$in. Although it contains no foam or other fixings to hold down a Spectrum, they can be put in by a user easily to his design.

The only thing to watch is the hinges on the front clasps as they are thin and will snap after prolonged use. They should be strengthened with carpet tape or flexible plastic sheet should be stuck over them. The cases are available in four colours.

Simple link with the outside world

AMBIT has produced a modem to go with its ZX-81 RS232 interface.

The 300 baud modem is acoustic-coupled to the telephone line by pushing the standard telephone handset into two foam blocks containing a microphone and loudspeaker on top of the modem.

That makes the unit usable on a normal telephone and it does not have to be wired-in and does not require British Telecom to provide a special plug.

The modem is easy to construct but a few points need to be emphasised which are not in the notes.

One is that the kit does not include a power supply for +12V/+5V/−12V required to run the modem. You will have to design and build one on Veroboard, as the company does not market a suitable one. The circuit relies on through-the-board connections made by soldering the component wires on both sides of the board, so check them carefully.

No mention was made of how to connect the piezoelectric devices used as loudspeaker and microphone.

The microphone has three connections and was found to work correctly only when the outer two were used.

It is recommended that you also buy the hardware kit, as it makes a portable box as well as containing all the electronics in the bottom.

Tried with several databases, including the Ambit Rewtel, it worked extremely well.

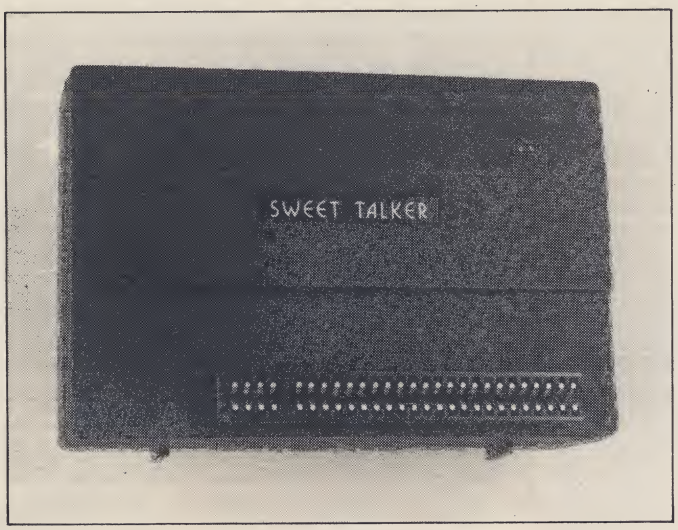
The ZX-81 interface costs £32.40, the modem £22.94, and the hardware kit for the modem £13.80, plus a flat charge of 60 pence for postage.

The interface to the modem is TX data, RX data and Carrier — RS232 standard. You will also need a motherboard of some size with the interface, as the program to run it needs more than 1K and the interface is not supplied with an edge connector.

Ambit International, 200 North Service Road, Brentwood, Essex CM14 4SG. Tel: 0277-23090.

Natural sounds by Cheetah

CHEETAH MARKETING has produced a speech output device called the Sweet Talker. It is complete in a black plastic box the same size as the 32K RAM pack for the Spectrum. The unit contains a very powerful amplifier and the tape with it not only autoruns to introduce itself but also shows some very good programming practice.



The instructions are very simple and the unit should not clash with any joysticks or other items, as it uses I/O port address 7. That may clash with some Sinclair peripherals — the Microdrive, for instance — as Sinclair tends to use only one bit of an address going low to operate equipment and using port 7 takes all the bits from B7 to B3 low. Cheetah is looking into that and may modify the address.

Programming is done by using phonetic sounds which allow you to produce the sounds necessary to make up a full word. They are put out as numbers to Sweet Talker in sequence from a DATA statement when you want words spoken. Silences can be included to stop the words or to provide pauses between words — of up to 200ms. The Sweet Talker seems to be about eight to 10 times as slow as others available, which makes it sound more natural. There are ZX-81 and Spectrum versions.

Sweet Talker is available from Cheetah Marketing, 359 The Strand, London WC2. Tel: 01-240 7939. John Menzies and Boots also stock it. The cost is £34.95.



EXPRESS DELIVERY - ORDER NOW

Please send me by return of post, Cassette 50 at £9.95 per tape. I enclose a cheque/postal order for £ _____ made payable to Cascade Games.

Name _____

Address _____

_____ Post Code _____

Country _____

Dealers & Stockists enquiries welcome.

Please send me (tick appropriate box)

Spectrum ☐ VIC ☐

cascade

Cascade Games,
Suite 4, 1-3 Haywra Crescent,
Harrogate, N. Yorkshire, HG1 5BG.
England.
Telephone: (0423) 504526

SU11/83

kemp

"On a large computer system a file of this nature would cost between £150–£700."

The above quote from one of the U.K.'s major software wholesalers on one of our programs confirms our belief that we offer the best business software on the Spectrum. Our software has been professionally designed and tested over a considerable period of time and is now available NATIONWIDE. No other Spectrum software offers the same range of facilities and none has received such high praise.

Sales Ledger	Up to 1250 entries per month
Purchase Ledger	,,
Stock Ledger	,,
Stock Control	Unlimited entries

Only £15.95 each (48K Spectrum only)

Available at Selfridges and at all good computer shops. Available shortly on Micronet 800.

Nationwide wholesale distribution by Microdealer U.K. and P.C.S. Distribution.

Kemp Limited, 43 Muswell Hill, London N10 3PN
Dealer Hotline 01-444 5499



WIN THE POOLS?

48k

SPECTADRAW 2

SPECTADRAW 2 is a Pools Prediction Program for the 48K ZX Spectrum Microcomputer.

The program looks at the recent form of the teams playing in each week's English and Scottish football league matches and then refers to a large database to see what has happened in the past when teams with similar form met. By combining the lessons learnt from the past with the teams' current league position, the program generates a draw probability factor for each match. It can then identify the matches which are likely to yield draws and output suitable predictions. It will also output the least likely draws for the benefit of those who prefer the fixed odds lines on coupons.

The program is supplied complete with a database tape containing data on over 7500 matches and a comprehensive instruction manual.

Program, database (both on high quality cassette) and instruction manual **£12.95** inclusive. (Cheques/PO's payable to B.S. McAlley).

SPECTADRAW
1 Cowleaze, Chinnor, Oxford OX9 4TD

Use your joystick with all your favourite arcade games

SPECTRUM PROGRAMMABLE JOYSTICK INTERFACE

Compatible with all Atari type joysticks (Kempston, Quickshot etc.)

Incredibly simple to program, just press a key on your Spectrum and move the joystick in the direction that you require. From then on, moving the joystick will give exactly the same results as pressing the key.

Full, simple to follow, instructions supplied.

ONLY £22.50 (plus £1 p&p)

NEW SPECTRUM SOFTWARE

(48K) **ROULETTE** Up to 6 players. Multiple bets allowed. Realistic table and spinning wheel. Lose your shirt in the comfort of your own home. **ONLY £4.95**

(48K) **SPECTRUM GAMES II** (Cheeky Chimp, Spec-Man, Spec-Panic, Berserker, Frogger). **ONLY £4.95**

(16K) **SPECTRUM GAMES III** (Cosmianoids, Dodgem, Stunt Driver – All fast machine code). **ONLY £4.95**

(16K) **POT-POURRI** (Track 'n Attack, Blackjack, Superscript, Char-Wallah) **ONLY £4.95**

(48K) **TUBE TRAIN TERROR** Can you overcome the perils on your journey and deposit the bullion at the Bank? **ONLY £5.95**

(16K) **SPECTRUM GAMES I** (Airport, Alien, Crabs – Reviewed in Sinclair User/What Micro) **SPECIAL OFFER £3.95**

(16K) **ANT ATTACK** Fight the marauding ants in this fast machine code arcade game. Beware of the rogue ant. 3 levels of play. **ONLY £4.95**

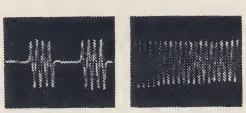
New Educational games available for 7–11 year olds, designed by the deputy headmaster of a primary school. **JUPITER ACE software now available.**

NEW

JRS FAST LOAD SYSTEM

Left: 2 data bits using ZX81 load

Right: 21 bits loading in same period using FAST LOAD



Now you can use the widely acclaimed JRS Fast Load system on your own cassettes. No additional hardware required. Allows a 16K programm to load in under a minute. ONLY £8.50

Full range of ZX81 software available. Send S.A.E. for lists.

GRAPHICS TOOLKIT

(16K or 48K Spectrum)

Over 40 machine code routines that you can call from your BASIC programs to improve your screen displays. Complete with demonstration program plus tips on producing fast routines for kaleidoscopic screen displays that are a favourite demonstration of the BBC micro.

ONLY £5.50

Send £1.00 for our new comprehensive Summer Catalogue (refundable against first purchase). Please include large stamped addressed envelope.

24 hr Ansafone for Access and Barclaycard orders

ORDER FORM: To JRS SOFTWARE LTD, (Dept.), 19 Wayside Avenue, Worthing, West Sussex BN13 3JU

Please supply the following:–

Quantity	Description	Price

(VAT and p&p are incl.) Total £

I enclose my cheque/P.O./Money Order for £_____
or charge my Access/Barclaycard Account No:

Name_____

Address_____

_____ Signature_____

JRS SOFTWARE

19 WAYSIDE AVENUE, WORTHING, SUSSEX. BN13 3JU Telephone: (0903) 65691

New angle lacks new excitement

HANG GLIDER is yet another variation on the theme of guiding a craft along a tortuous path. In this case the craft is a hang glider which flies above a river. There are several maps and for each you have three gliders. If you touch the buildings, mountains or whatever on either side, or if you lose altitude and fall into the river, you lose one glider.

The glider's circular movements, based on hang glider performance, introduce a note of difficulty which makes the game more interesting but otherwise as you do not score until you have made a safe landing, there is not a tremendous amount of excitement. Six grades of play will help to improve your piloting skills.

Hang Glider for the 16K ZX-81 is from S Electronics, 1 Orchard Road, Hayling Island, Hampshire.

Slow motion

WORLD OF ILLUSIONS, for the 16K ZX-81, features a robot called Jimmy who is attempting to reach the centre of a maze to destroy a giant globe, picking-up along the way various pieces of equipment which are guarded by giant bats.

The graphics — bats, globe and the evil Dr Brock — are impressive but the action is painfully slow and the bats stubbornly resist attempts to blast them out of existence with a laser.

There are three levels of play but they only reduce the time allowed to reach the centre of the maze without speeding the game.

World of Illusions is available from Contrast Software, Farnham Road, West Liss, Hampshire GU33 6JU, and costs £4.95.

Getting the odd word into a limited space

MOST PEOPLE either hate or love word puzzles; there is no in-between. The same can be said for **Wordfit,** an exercise in literary skill, which runs on the 16K ZX-81. The program designs a word square which can be from eight characters across and down to 20 characters.

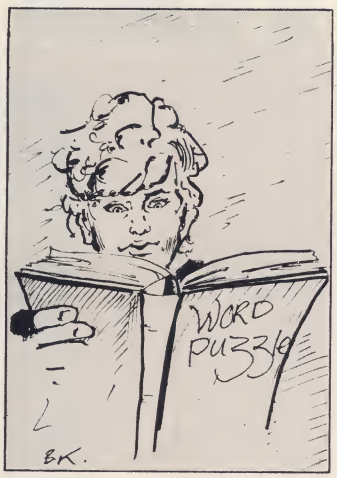
On the first level of eight characters you have a free choice of the words you want to enter on the grid but from the second to most difficult level random letters are scattered around by the computer which you must fit into words.

You can leave or change the game at any time during play. You can clear a square and start again or opt to start on a higher or lower skill level.

To put words into the square you must position the flashing cursor where you want the words to start and then type-in your word. If you use a word twice the computer will inform you with an error message and as you enter words the computer will display the number of words which you have on the screen.

The game is interesting for a time but soon it becomes repetitive. When you have been through all the levels once you can lose interest very quickly.

The action is fast and you are not kept waiting for the computer to form the next word square. The main problem with the package is the lack of good instructions. Only the main options are shown on the insert card and there is no explanation of how the game works or the philosophy behind it.



Wordfit will provide entertainment for those who attempt *The Times* crossword every day. It costs £5 and can be obtained from Ramwriter, 3 Vumbra House, 2 Cedar Gardens, Sutton, Surrey.



Sparkle is lacking

SIX GAMES on a single tape for the 16K ZX-81 have an introductory trailer which is enlivened by some crude but amusing graphics. You load each program individually.

The process might have been a little less laborious if the games were on two sides of the tape instead of only one.

The games are satisfactory, though hardly sparkling with originality. **Centipede** is a variation on the shoot-out theme; in this case you shoot the centipede while trying to avoid the lawnmower and the grasshopper.

In **Haunted House,** you are chasing food and energy pills while being chased by ghosts— shades of Pac-man. **Berzerk** entails escaping from robots, **Nasties** is another shoot-before-they-get-your-power-pods game, and in **Kong** you have to climb down a building while being pelted with barrels, and there is even a pretty girl to kiss you if you reach the bottom.

Finally, **Kermit** is a variation on the theme of taking the frog for a walk, watching for traffic on a busy road. The tape is available from A Stubbs, Astle Farm East, Chelford, Macclesfield, Cheshire SK10 4TA.

Genuine hi-res in space invasion

ODYSSEY Computing has achieved the remarkable feat of producing, with no extra hardware, a genuine high-resolution version of Space Invaders for the 16K ZX-81. **Invaders** offers superior graphics and allows one or two people to play and provides a choice of missile-firing and bomb-dropping rates. The result is an absorbing game which should satisfy trigger-happy space fighters. Invaders is from Odyssey Computing, 28 Bingham Road, Sherwood, Notts NG5 2EP. It costs £4.95.

FREE SOFTWARE!
FREE HARDWARE!

THE SOFTWARE



Leopard Lord

Conquer monsters, mazes and magical items, face Fordel the Leopard Lord. Fight tooth and nail for your life.

£10 Spectrum 48K, Dragon 32, Oric 48, Commodore 64.



Terror from the Deep

If a storm sinks your ship, could you survive to rid the world of the Terror from the Deep?

£10 Spectrum 48K, Dragon 32, Oric 48, Commodore 64.



Ace in the Hole

Ace Brannigan, can you escape the Humane Orbital Legislation Enforcer and reach your shuttle and freedom?

£10 Spectrum 48K, Dragon 32, Oric 48, Commodore 64.



Horror Atoll

What is the object on the rock in the middle of the lagoon? Can *you* destroy it?

£10 Spectrum 48K, Dragon 32, Oric 48, Commodore 64.



Cry Wolf!

You have become a werewolf. Only Albanon the Seer can help you in time.

£5 Spectrum 48K.



Ziggarat of Dread

Fight the priests of Dreshing, enter the Ziggarat of Dread and rescue your sister before she mutates.

£5 Spectrum 48K.



Tobor

A game of strategy and skill for one or two. Fight the squadrons of robots through 6 levels.

£5 Spectrum 48K.



Chuckman

Popular arcade based game with extras. Follow the quickest route to defuse the time bombs.

£5 Spectrum 48K.



Lost over Bermuda

Will the Bermuda Triangle claim you as its next victim? Will you return alive?

£5 Spectrum 48K.

Cassettes for the Spectrum – £5 each

Fisherman Fred
E x T
Penguin
Sea-Battle
Cosmanoids
Diamond Mine
Golf
Toolkit
Grid Bug

One-Arm Bandit*
Efenders*
Eteor Torn*
'N' Vaders*
Terroroids*
Goblin Crusher*
Never Trust a Blond*

Assembler*†
Disassembler*†

*48K Spectrum Only
†£10 each

Picnic Adventure BBC only £5.

Cassettes for the VIC 20 · Unexpanded – £10 each

GAMES PACK 1
Fruitshop
Sea Wolf
Cube
Peckman

GAMES PACK 2
Frogger
Invaders
Othello
Roboball

GAMES PACK 3
Head on
Apollo 8
Wobble Board
Space Attack

GAMES PACK 4
Crazy Balloon
Sea War
Mazerace
Breakout

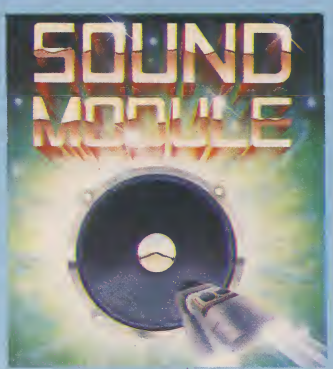
THE HARDWARE



THE LIGHT PEN

CREATE PICTURES, SKETCHES AND GRAPHS OR 'PICK' FROM MENUS. COMPLETE WITH INTERFACE CIRCUIT (PLUGS DIRECTLY INTO THE USER PORT) AND SOFTWARE PROGRAM WITH COMPREHENSIVE INSTRUCTIONS.

£30 SPECTRUM, BBC, ORIC, DRAGON, VIC 64, AND VIC 20.



SOUND MODULES

£10 BBC Sound Module fits neatly inside your machine to let the sound come through the more powerful speaker on your television. No soldering required.

£15 SPECTRUM Sound Module plugs into the user port and generates its own sound through its own speaker.

ADD-ON ELECTRONICS LTD
Units 2,3&4
Shire Hill Industrial Estate,
Saffron Walden,
Essex CB11 3AQ

For every £1 of hardware you buy you can choose £1 of software absolutely free. (except Manta Printer)

OR

For every £1 of software you buy you can choose £1 of hardware absolutely free.



Arcane Quest

Can you face the beastly one with nothing but a cross and a heart full of purity?
£10 Spectrum 48K, Dragon 32, Oric 48, Commodore 64.



The Roundsby Incident

You are a mercenary in the Service of Rambol the Merchant. What is Roundsby's secret?
£10 Spectrum 48K, Dragon 32, Oric 48, Commodore 64.



3D Star Wars

You become Luke Clearthinker to battle an entire rebel space fleet on your own to save mankind?
£5 Spectrum 48K.



Security Shelter

You are a 'Gatherer' selected by your unique abilities to probe the mystery of the 'past timers' building.
£5 Spectrum 48K.



STANDARD KEYBOARD FOR SPECTRUM

The keyboard comes complete with high-impact black plastic case and typewriter-style keys. Full easy fitting instructions.
£30

STOP PRESS!



MANTA PRINTER®

Permanent hard copy of whatever is on the screen, prints 80 chars. per second, 40 cols. in width, upper and lower case letters and graphics.
Oric, Dragon, VIC 20, Commodore 64, Aquarius®, Spectrum, BBC.
£120

+ £30 of software

® Registered Trade Mark

EITHER choose the games you want then tick your free hardware to the same value
OR choose the hardware you want and tick your free software to the same value.

SOFTWARE	Qnty	Price	Total	Machine
Leopard Lord		£10		
Terror from the Deep		£10		
Ace in the Hole		£10		
Horror Atoll		£10		
Arcane Quest		£10		
Roundsby Incident		£10		
Cry Wolf		£5		Spectrum 48K
Ziggarat of Dread		£5		Spectrum 48K
Tobor		£5		Spectrum 48K
Chuckman		£5		Spectrum 48K
Lost over Bermuda		£5		Spectrum 48K
3-D Star Wars		£5		Spectrum 48K
Security Shelter		£5		Spectrum 48K
Games Pack 1		£10		VIC 20
Games Pack 2		£10		VIC 20
Games Pack 3		£10		VIC 20
Games Pack 4		£10		VIC 20
Fisherman Fred		£5		Spectrum
E x T		£5		Spectrum
Penguin		£5		Spectrum
Sea-Battle		£5		Spectrum
Cosmanoids		£5		Spectrum
Diamond Mine		£5		Spectrum
Golf		£5		Spectrum
Toolkit		£5		Spectrum
Grid Bug		£5		Spectrum
One-Arm Bandit		£5		Spectrum 48K
Efenders		£5		Spectrum 48K
Eteor Torn		£5		Spectrum 48K
'N' Vaders		£5		Spectrum 48K
Terroroids		£5		Spectrum 48K
Goblin Crusher		£5		Spectrum 48K
Never Trust a Blond		£5		Spectrum 48K
Picnic Adventure		£5		BBC
Assembler		£10		Spectrum 48K
Disassembler		£10		Spectrum 48K

Please indicate machine **Total £**____

NOW CHOOSE HARDWARE TO THE SAME VALUE

HARDWARE	Qnty	Price	Total	Machine
Keyboard		£30		Spectrum
The Light Pen		£30		
Sound Module		£10		BBC
Sound Module		£15		Spectrum

Please indicate machine **Total £**____

NOW CHOOSE SOFTWARE TO THE SAME VALUE

Manta Printer		£120		

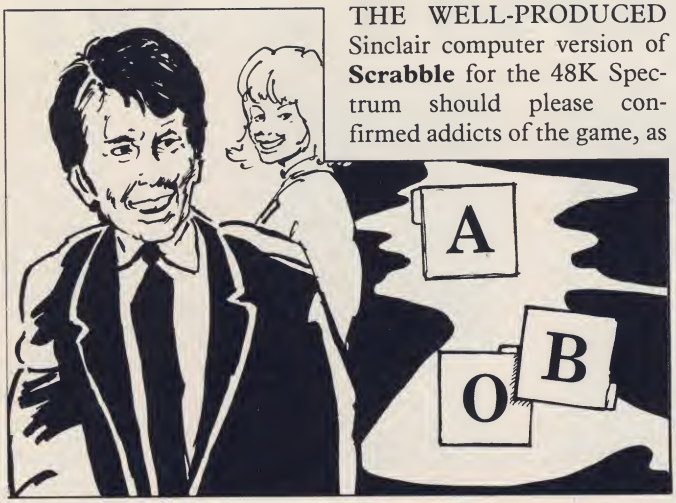
All prices include P&P and VAT UK only (Add £1 for Europe)

I enclose cheque to the value of £____ or credit my Access ☐ Barclaycard ☐
No. _____ Exp. Date
Name _____
Address _____
_____ Postcode _____
Phone _____
Signature _____ SU Send coupon to:

ADD-ON ELECTRONICS LTD

Units 2, 3 & 4, Shire Hill Industrial Estate, Saffron Walden, Essex CB11 3AQ
This offer applies to mail order only

Scrabble will satisfy addicts and novices



THE WELL-PRODUCED Sinclair computer version of **Scrabble** for the 48K Spectrum should please confirmed addicts of the game, as well as novices, with its easy-to-follow instructions and quick computer responses.

One to four people can play and the computer can represent any number, including all four, thus turning Scrabble into a spectator sport. It has 11,000 words in its vocabulary and will challenge any player who tries to enter a word which is not in the store.

Nevertheless, provided the other players permit, it is still possible to enter a non-existent word to register a high score, a slight weakness in this game although, in the long run, it is more fun not to cheat.

As in real Scrabble, you can trade letters on your rack, juggle them about, miss your turn, and even save an unfinished game for later.

Six levels of difficulty provide a challenge even for experienced Scrabble fans.

Computer Scrabble is available from Sinclair Research, Stanhope Road, Camberley, Surrey GU15 3PS. It costs £15.95.

Users kept in the dark with Hard Cheese

DK'TRONICS **Hard Cheese** would be much improved by a set of instructions; none appear on either the insert or the tape. Whatever the storyline, it is a simple Pac-man-type game in which the aim is to reach the big cheese in the middle of the screen before being eaten by the cats which are in hot pursuit. Neither the action nor the graphics are earth-shaking but there is a certain challenge in overcoming the difficulty of reaching the middle.

Hard Cheese for the 16K Spectrum is available from dK'tronics, Shire Hill Industrial Estate, Saffron Walden, Essex, and costs £4.95.

Slowest game in the galaxy

GALAXY ATTACK is possibly the slowest machine code space-arcade game for the 48K Spectrum.

The graphics used look as if they were prepared for the readers' programs section of a computer magazine and there seems to be no professional sheen to the game at all.

You must take your ship through the depths of space, destroying as many alien ships as possible on your way, before you crash-land on a far-off planet.

The object of your quest, once you have crashed, is to repair your spaceship before the deadly walkers destroy you.

If you reach the third part of the game, which we very much doubt you will, you will find yourself fighting the mothership.

We doubt that you will get further than the second level, as the first will sap all your key-pushing strength. The displays used are colourful but flat and lifeless.

Galaxy Attack is a game for those who are willing to spend hours wading through instructions displayed on the computer screen.

It can be obtained from Sunshine Books, Hobhouse Court, 19 Whitcomb Street, London WC2 7HF. It costs £5.95.

Signalman's nightmare

THE TRAIN GAME for the 16K Spectrum is any budding signalman's dream. It is also an excellent game which is original, well-thought-out and full of action. The idea is that as the newly-appointed chief operations manager of a railway you must keep the trains running, switching points to avoid derailment and stopping at stations to pick up passengers. That is also how you score.

There are several levels of play—and each has sub-levels—with more and faster trains for the increasingly expert player. Even at the simplest level there is plenty to think about. The graphics are simple and realistic, and the scoring, hazards and bonuses are explained very clearly in the insert. Altogether an absorbing and amusing game which might even make you appreciate British Rail.

The Train Game from Microsphere Computer Services, 72 Rosebeery Road, London N10 2LA costs £5.95.

Suffering in the Styx

EMERGING from the perils of **Styx** unscathed is not easy. A three-level arcade/adventure game for the 16K Spectrum, it has a spider-filled maze at the top of the screen, a piranha-infested river fringed with deadly seaweed in the middle, and infernal regions haunted by an evil, shrouded figure at the bottom. All you have on your side are fast fingers and your laser power. Nevertheless, a reasonably lively game, if you do not let the piranhas get you down. Styx can be obtained from Bug-Byte, Mulberry House, Canning Place, Liverpool.

Correction

'IN SEPTEMBER we reviewed the Softek **Firebirds,** in which we stated that it had launched a range of programs, of which Firebirds is one, all created by the company compiler. It has been pointed out by Softek that that is not the case, that it has not launched a range of compiled games called Ultima, and that Firebirds was written in pure machine code.'



Toad needs extra pace

EVERYBODY seems to have a fascination with frogs and toads which are likely to be squashed by lorries, bitten by snakes or drowned by dipping turtles.

The latest in a long line of frogger games is called **Road Toad** for the 16K Spectrum.

The toad must jump through three lanes of heavy juggernauts, evade the snakes on the river bank and jump across logs and turtles to get to the lily pads at the top of the screen.

You are given two toads and 100 seconds to avoid all the obstacles.

It would have been better to give the player less time and more frogs because the highway is so packed with lorries that it is difficult to escape even from the first lane.

As with the original arcade version, one or two players can compete against each other for the fastest time in which to get the frogs across.

Unfortunately dK'Tronics has not included a joystick option so it is not as easy to play as it should be.

It is difficult to become accustomed to the key layout as the up, down, left and right keys are all in line and next to each other. As a result it is easy to mix those key combinations.

It would have been better to separate the keys and put them in a joystick configuration.

Road Toad can be obtained from dK'Tronics, 23 Sussex Road, Gorleston, Great Yarmouth, Norfolk. It costs £4.95.

Riding into the last sunset at high speed

ACCORDING to the insert, **Last Sunset for Lattica** represents a distant world where, amid a maze of crumbling building, you have to locate a bomb and defuse it before it blows the entire planet to smithereens.

You are pursued by androids and you must avoid the walls, which are electrified; on the other hand, scattered about are life potions which will give you a new life if you are zapped.

That is the story but this game for the 48K Spectrum is so fast-moving that you will probably forget all about it in the heat of the action.

The fact that you can fire only in the direction in which you last moved tests the reactions even further and if you achieve a high score, you will get a new screenful of hazards. There are several levels of play.

Not a very original concept and the graphics are simple but this is still an exciting, action-packed game which could well prove addictive.

Last Sunset for Lattica is from Arcade Software, Technology House, 32 Chislehurst Road, Orpington, Kent BRG 0DG and costs £5.50.

Striking graphics confusing

ANYONE who has seen 3-D Tunnel will find **Vortex** for the 16K Spectrum familiar. The story is that you are in a spacecraft caught in the gravity well of a giant neutron.

Your job is to fly out of the vortex while firing at the various space monsters attacking you.

The flashing graphics are striking but a little confusing, making scoring difficult. There is also a long and wordy introduction which provides very little helpful information, but fortunately you can go straight to the game without looking at it.

Vortex is available from J K Greye Enterprises, 16 Park Street, Bath, Avon BA1 2TE. It costs £5.95.

Searching for the familiar

QUEST for the 48K Spectrum follows a now fairly familiar adventure format featuring dwarfs, elves, swords, pieces of gold, black spiders, dragons, and a thick forest through which you might find yourself wandering interminably. The graphics, when you finally encounter them, are polished, and experienced adventure games players will probably enjoy trying to guess what answers and actions are required.



Very few prompts are given in the course of the game but the insert gives detailed instructions.

Novices may spend a good deal of time on a rough track choosing whether to go north south, east or west—the game derives plenty of mileage from sending you back to where you started.

You may also be axed suddenly by an elf or killed by a rat, just as you thought you were doing the correct thing, but you can be resurrected. At least you can be sure that it will take time before you exhaust the possibilities, if you are not discouraged first. One hint we can give—it is no use trying to bribe the dwarfs.

Quest is available from Hewson Consultants, 60A St Mary's Street, Wallingford, Oxfordshire OX10 0EL. It costs £5.95.

PLAY TH

Arcade Action For The ZX Spectrum

SPECTRAVISION JOYSTICK £9.95 (arcade action, pistol grip, ATARI® Compatible)



If you want Arcade quality control for your Sinclair ZX Spectrum, you'll find the Protek combination hard to beat. The interface is compatible with a range of software including a number of titles from: ULTIMATE, SILVERSOFT, RABBIT SOFTWARE, QUICKSILVER, QUEST, PSION, NEW GENERATION SOFTWARE, IMAGINE, OCEAN, plus many more.

The protek joystick interface is simple to use. It just plugs in at the back of your Spectrum and is compatible with any "Atari type" Joystick Connector. We recommend the Spectravision Joystick at only £9.95 for Pistol Grip Joystick with a top and base fire button plus specially contoured shape and rubber suction cup footing for single hand operation.

Protek JOYSTICK INTERFACE £14.95













HE GAME

HUNTER-KILLER

For the 48K ZX Spectrum

Can you Captain a World War II submarine, hunt the enemy then destroy him with your torpedoes?
Realistic simulation including:

(a) 4 separate screen displays
(Control Room, Chart Room, View through Periscope, Navigation Chart)
(b) 18 control functions
(c) Quick kill option

Written by Rod Hopkins

£7.95

Sensational new two-computer option. Additional hardware required, available soon



TRADE ENQUIRIES WELCOME

Protek
COMPUTING LTD.
1A Young Square, Brucefield Industrial Estate,
Livingston, W. Lothian.

Subject to availability. Prices correct at time of going to press.

Ready, Set, Draw!



Now, with Melbourne Draw, you can create dazzling, intricate colour graphics and pictures on your Spectrum screen without special programming skills.

Just look what you can do:

- Create more exciting graphics and characters in your own programs.
- Reduce or enlarge images to any size.
- Add special effects and depth to your game backgrounds.
- Enlarge sections of the screen display up to sixteen times for intricate detailing, then reduce them back to their original size.
- Create personalised titles and lettering anywhere on the screen in any direction — even backwards or upside down.
- Control and alter the colours of your Spectrum at will.
- Store all your graphics on to cassette.
- Easily create and define UDG (User Defined Graphics) characters — you can even store your custom UDG areas on cassette.

You can use Melbourne Draw to explore all artistic possibilities offered by the exciting new creative medium of computer graphics, and create any illustration or picture you want.

Melbourne House Publishers

SU11D

SPECTRUM Books

- ☐ Understanding Your Spectrum **NEW LOW PRICE** £6.95
- ☐ Spectrum Machine Language for the Absolute Beginner **NEW LOW PRICE** £5.95
- ☐ Over The Spectrum **NEW LOW PRICE** £4.95
- ☐ The Complete Spectrum ROM Disassembly £9.95
- ☐ Spectrum Hardware Manual £5.95
- ☐ Spectrum Microdrive Book £5.95
- ☐ Supercharge Your Spectrum £5.95
- ☐ Please send me your free 48 page catalogue

48K Spectrum Cassettes

- ☐ Penetrator £6.95
- ☐ The Hobbit £14.95
- ☐ Terror-Daktil 4D £6.95
- ☐ Melbourne Draw £8.95
- ☐ H.U.R.G. £14.95
- ☐ Computer Bridge £8.95
- ☐ Abersoft Forth £14.95

All prices include VAT where applicable. Please add 80p for post and pack.

I enclose my cheque/money order for £

Please debit my Access Card No. Expiry Date

Signature

Name

Address

Postcode

£

£ + p/p .80

Total £

Orders to:
Melbourne House
131 Trafalgar Road
Greenwich London SE10

Correspondence to:
Melbourne House
Tring
Hertfordshire

Trade enquiries welcome

All Melbourne House cassette software is unconditionally guaranteed against malfunction.

Access orders can be telephoned through on our 24 hr ansafone (01) 858 7397.

MICROPOWER MICROPOWER MICROPOWER MICROPOWER MICROPOWER MICROPOWER

THE MICRO POWER SPECTRUM
'ADD-ON'

Bring 'JOY' to your Joysticks!!
Make your beeps BEEP!!
BLADAM!!
Create Multi-Channel Sound Effects!!
BOOM

The new Spectrum Add-On gives you:
- ONE Atari/Commodore type Joystick Port
- TWO Potentiometer Joystick Ports
- Amplification of the standard sound output
- THREE-CHANNEL, PROCESSOR INDEPENDENT, PROGRAMMABLE SOUNDS — music, gun-shots, explosions etc
- Demonstration tape and full operating instructions

Note: The 'Add-On' simply plugs straight onto the back of your Spectrum.
No soldering required.

Now offered at the incredibly LOW price of
£19.95 Incl. VAT
(Please add 55p Post & Packing).

JOYSTICKS (Potentiometer-Type)
BUILT £7.45 KIT (incl. case) £5.95

MICRO POWER

NOTE: We stock (and market) PROGRAM POWER SOFTWARE for the BBC, ACORN, SPECTRUM and DRAGON 32. Send S.A.E. for appropriate catalogue.

8/8a REGENT STREET,
CHAPEL ALLERTON,
LEEDS LS7 4PE.
Tel. (0532) 683186 or 696343

BBC, DRAGON & ACORN DEALERS

VISA

MICROPOWER MICROPOWER MICROPOWER MICROPOWER MICROPOWER MICROPOWER

BRIDGE MASTER

An audio course that will teach you to play bridge on your home computer.

"Bridgemaster really does bring the game alive for the beginner... is a far better medium for learning bridge than even the best teach yourself books."... Soft

"A really professional program for a microcomputer... For a learner this offering is ideal... One hundred percent value for money."... Home Computing Weekly

The package, prepared with world expert Terence Reese, contains commentary and computer tapes and a useful reference book – everything you need to learn bridge.

For the Sinclair ZX Spectrum 16/48K – **£24.95.** For the ZX81 16K – **£19.95,** ZX81 1K – **£19.95.**

Available from Boots,* WH Smith* and other leading computer stores or direct from Bridgemaster, FREEPOST, Dept. S3, PO Box 163, Slough SL2 3YY.

*Spectrum version only.
Prices include VAT, post & packing. Cheques & PO's should be made payable to Bridgemaster.

Put everything you need on the keyboard with a Custom Keypanel Kit.



Everything you need IS on the keyboard with CUSTOM KEYPANELS.

These precision die-cut plastic panels fit perfectly over your keyboard and provide an instant and individual reference to all of your software.

Each Kit comes in a clear plastic storage wallet and contains: 10 Matt-black Keypanels plus sheets containing over 140 self adhesive Command labels pre-printed with words, symbols and arrows, plus a sheet of blanks for your own designs.

SPECTRUM KEYPANELS are 96x224mm and the labels are printed in 'Spectrum' bright red. A MUST for flight-simulation and all multi-key games and applications.

The FIRST add-on for your Spectrum.

ORIC KEYPANELS are 105x275mm and the labels are 'ORIC' blue. Master those CTRL and ESC key combinations.

An INSTANT reference to all ORIC's keyboard functions.

NOW IN 'SUPER ML' PLASTIC!

Post today to **Softeach Limited**, 25 College Road, Reading,, Berkshire, RG6 1QE. We despatch to you first class post by return.

Please send me:

..... Spectrum Keypanel Kits at £3.95 + 35p p&p each (overseas should add 25% for additional surface mail)

..... ORIC Keypanel Kits at £4.95 + 35p p&p each (overseas should add 25% for additional surface mail)

I enclose a total remittance of £..... cheques/postal orders payable to **Softeach Limited.**

NAME

ADDRESS

..... SU S

HEWSON CONSULTANTS

FOR SOFTWARE THAT CHALLENGES MIND AND DEXTERITY . . . WHATEVER YOUR TASTE, WE HAVE SOMETHING FOR YOU

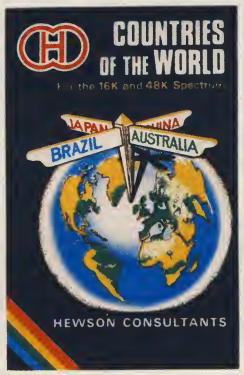
SPECTRUM



For the 16K Spectrum.
YOUR TASK: to direct incoming aircraft from holding stacks to runway – smoothly, safely and expeditiously.
YOUR INSTRUMENTS: Radar screen showing aircraft call signs, blips and trails. Four stack displays giving altitude, heading, speed and size.
SEVEN levels of play including a demonstration mode.
FEATURES: mixed aircraft, restricted airspace, minimum separation, outbound traffic, emergencies, unknown aircraft, radio failure, loss of a runway, instrument failure.



Find a map hidden in an inhospitable world inhabited by Dragons, Elves, Centaurs and other gruesome creatures. Role play the Wizard, Cleric Rogue, Fighter or Simpleton, each with different characteristics. Fight your way through the Gloomy Castle, Maze and Mountains etc, with weapons and Magic. Remember things are not always what they seem. For the 48K spectrum.



An educational package which gives an appreciation of the location of all the countries of the world. Includes two fully detailed world maps. 16K version – shows the location and names the capital. 48K version – All the above plus population, area, currency, main languages etc and comparative statistics on the largest and smallest countries etc.



16K Spectrum. Defeat each squadron of Beeple Zaps and another appears only closer. Cyrian mothership with ejecting Zeetle Baps. 5 levels of play from Orions snail's pace to close your eyes and hope. Real time scoring. 3 lives. Pan galactic gargle blaster for highest score. Descending asteroids.



Fast and furious action. Joystick or Keyboard control. Locate the seiddab on your galaxy scanner. Scour the star studded blackness for your first sight of the enemy. Track their course and react rapidly as they try to break away. Let them grow in your sights and punch the fire button as they come into range.
16K or 48K Spectrum



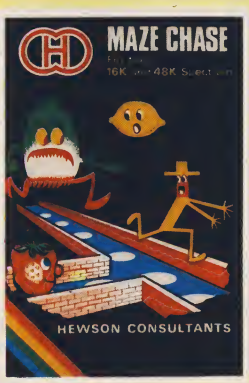
For the 16K Spectrum.
8 levels of play from novice to expert. Full colour display of tables and dice. Gamble on a single game or a series, double or quits. All the features of the ancient game.



A fast moving action packed arcade game. Climb the ladders, dig holes, bury monsters, eat the power pill, move fast to avoid being eaten. On screen scoring, 3 lives.
16K or 48K Spectrum



New all machine code version of our highly successful flight simulator. Now with perspective cockpit view, improved instruments, detailed map, four beacons and other enhancements. Multiple levels of play to develop your flying skills. Complete with printed flight debrief at the end of your flight – signed by the program author! The most realistic simulator on the market. 16K or 48K Spectrum.



For the 16 and 48K Spectrum, 4 or 12 mazes, highest score to date, 4 independent guardians, 3 lives, full colour, fast machine code action, magic strawberries, eat lemons to score more, real time scoring.



HEWSON CONSULTANTS

BBC



An educational package which gives an appreciation of the location of all the countries of the world. Includes detailed world map. Shows the location and names the capital plus population, area, currency, main languages, and comparative statistics on the largest and smallest countries etc. BBC Model B



Take the controls of your computer and fly by night over mountains to a safe landing. Take off, bank left and right, navigate between beacons, adjust the flaps and the rudder. A careful simulation of the deliberate operation of flying a plane – unrealistic speeds and altitudes cannot occur because your plane will crash. BBC Model B.



Steer your Formula One racer around one of five circuits – including Silverstone, Monza and Brands Hatch. Break the lap record only by strategy – and sheer courage. Pit stops, wet and dry tyres, chicanes, fire and weather hazards, means total concentration is needed – just to stay alive! BBC Model B.



DRAGON



Hi Res, real time flight simulator. Two runways, take off, bank, adjust trim, navigate between beacons, loop the loop, do barrel rolls and land. Superb cockpit display of dials and readouts. Instruments, Alt, ASI, VSI, AH, ILS, TS, RPM, GAS, TEMP, HDG, BCN, BRG, FLAP, and GEAR. Simply the BEST.

Selected software available from JOHN MENZIES, SPECTRUM and all leading micro computer software retailers.

Boots

Distributed by, Micro Dealer, Personal Computer Services, Computer Bookshop, Lightning, Wynd-Up, Leisuresoft, Websters and Mapsoft.

URGENT

We require high quality software for all the popular home computers. We pay top royalties.

Send in your programs today for fast evaluation and prompt reply.

40 BEST MACHINE CODE ROUTINES FOR THE ZX SPECTRUM *by Andrew Hewson and John Hardman*
How to load and save machine code. How to use the system variables. How program lines are stored. How to use the stack, the display, the attribute files. ROUTINES: Scroll – up, down, side to side by pixel or by character. Rotate character, invert character – horizontally and vertically. Line renumber – including GOSUBs, GOTOs, RUN etc., and many more.

20 BEST PROGRAMS FOR THE ZX SPECTRUM *by Andrew Hewson*
Program titles include: Machine Code Editor. Index File – filing system for the ZX Spectrum. Duckshoot. Graphix – construct up to 210 graphics. Plus football, digitiser, diary and many more.



Please rush me
(Tick boxes as required)

- ☐ BBC NIGHTFLITE £6.95
- ☐ 3D SPACE-WARS £5.95
- ☐ QUEST ADVENTURE £5.95
- ☐ NIGHTFLITE £5.95
- ☐ HEATHROW A.T.C. £7.95
- ☐ SPECTRAL PANIC £5.95
- ☐ MAZECHASE £4.95
- ☐ SPECVADERS £4.95
- ☐ COUNTRIES of the WORLD BBC. £6.95
- ☐ GRANDPRIX £6.95
- ☐ BACKGAMMON £5.95
- ☐ COUNTRIES OF THE WORLD £5.95
- ☐ DRAGONFLY (For Dragon 32) £6.95
- ☐ 20 BEST PROGRAMS £5.95
- ☐ 40 BEST MACHINE CODE ROUTINES £5.95

NAME _____
Block Capitals please
ADDRESS _____

_____ POSTCODE _____

Post to HEWSON CONSULTANTS 60A St Mary's Street, Wallingford. Oxon. OX10 0EL.

* I ENCLOSE MY REMITTANCE OF _____

* MY CREDIT CARD NUMBER IS _____

* (Delete as appropriate)

SIGNED _____ SU 11

Make cheques/PO's payable to Hewson Consultants

Telephone (0491) 36307

Making golden listings from the leaden Basic

Speed and smoothness of action is what everyone attempts to achieve in programs. John Gilbert reports on compilers

IT IS the dream of a Basic programmer to have a slow-running, jerky, Basic program turned instantly into machine code. That is possible using a compiler which will take a Basic listing and translate it into a form of machine code. The benefits are that the program instructions are less open to prying eyes and piracy. It also means that the programs will run faster.

Anyone who has some idea of how Sinclair machines work will appreciate that neither the ZX-81 nor Spectrum can read Basic code directly. They have to use a program called an interpreter which is stored in the ROM. That program translates Basic into a code which the machine will understand.

When you write a machine code program the need for the interpreter is removed. The interpretation of Basic takes up a good deal of time, so when no interpretation is needed the program will run faster. A compiler generates code which dispenses with the need for the interpreter.

Unfortunately none of the compilers on the market will translate all Basic instructions into machine code. The usual level of translation ranges from 90 percent to 95 percent.

Softek was the first company to produce a compiler and that was for the 48K Spectrum. Its main claim to fame was that you could speed graphics displays in programs. That it did very well and in so doing provided a facility which had not been seen on the Spectrum.

Like other companies which produce compilers, Softek upgraded its design of the compiler whenever it could. The company is in the process of launching two new compilers, one of which operates using integer Basic; the other is a great step forward in Sinclair computer compiler design, using floating point numeric representation.

An integer compiler allows the use of numbers only in the format 3, 56, 9. They will now allow you to use decimal points with numbers in a program. In some cases that proves to be a problem. For instance, you may want to perform some mathematical operations, such as division, which will leave you with a decimal number. The restriction in the compiler means that you will have to use INT to make sure that the computer can handle the numeric representation.

A floating-point compiler is a great step forward as it will allow you to use decimal notation when performing mathematical operations.

That will allow the programmer to use most of the commands in Sinclair Basic. Softek claims that it will compile up to 99 percent of Basic which, compared to other compilers, is very good. Unfortunately the floating point compiler is slower than the new Softek integer compiler. The difference in speed is not too noticeable but it is best to use the new integer compiler for graphics in games and the floating point compiler for the accuracy in calculations is needed by scientists and teachers. With the two products Softek has taken control of the market.

The second company to put a compiler on the market was PSS. It was called MCODER, of which versions for both the ZX-81 and Spectrum were developed. MCODER has since been upgraded and MCODER II is available. Both versions of the compiler are similar.

> 'A boon to anyone who can write Basic well but cannot master machine code'

The MCODER II is fairly representative of what is on the market and it is worth looking at the type of commands it will allow the Basic programmer to use. Unlike the early compilers, it can use numeric and string variables as well as arrays.

The restriction to their use, of course, is that only integer numbers can be stored in them. Another restriction, which is not too great for most applications, is that the range of numbers which it can use if from −32768 to +32767. Again that is as a result of the way in which the machine stores numbers.

Arrays have to be one-dimensional and you cannot use string arrays with the MCODER. That is unfortunate but you can circumvent it by using ordinary string variables.

The input instructions include both INKEY$ and the usual INPUT statements. For input in a program the READ, DATA and RESTORE instructions are available. The compiler will handle characters only within strings which have a code less than 32 and more than 164. That means you cannot put Basic keywords into strings.

By allowing the range of codes indicated, the compiler can handle user-defined graphics, with codes ranging from 144 to 164. You can define your shapes in the usual way, using decimal notation with USR or the BIN numbers.

Other display statements include DRAW and CIRCLE, with PLOT and OVER also included in the catalogue of legal Basic statements. PRINT and PRINT AT are also available, although AT is not included in the documentation. The TAB function is not available but can be replaced easily with PRINT AT.

Several program flow statements are also included in the compiler. They include GOTO and GOSUB. The IF . . THEN statement can also be obtained.

The FOR . . . NEXT loop structure can be used in the same way as in Basic but one restriction on it is that you cannot use a loop number which is greater than 32767. That also applies to other instructions in the compiler subset, including IF . . . THEN and RND.

Even with all those restrictions you can overcome the problems and write almost any Basic application program.

All the compilers on the market stress ease of use and that is true. For instance, there are three ways of operating the MCODER. The first is to load the

compiler and enter your program by hand. After it is finished you can run the Basic to see if everything is working and there are no bugs. After that a quick machine code call will compile the Basic, which can then be run by a RAND USER 40000. The code can be moved round in memory if necessary but 40000 is the default location for the start of your routine.

You can load a Basic program from tape if you have one already developed and do not want to re-type it. To do so you must LOAD the Basic in the normal way after loading the compiler.

The third type of compilation allows you to translate two Basic programs into machine code in the same session. To do so, you will have to move RAMTOP and stack one program on top of the other. The two programs can then be called by separate USR instructions.

When you have told the computer to compile, one of two things can happen. You can either get an error code or you will get the OK signal.

If an error has been detected in your program, the MCODER will return your program listing with an 'S' beside the line which could not compile. It will then allow you to change that line and re-compile the code.

If you have had no difficulty you can invoke your program using USR to see that it runs faster than in Basic. You can then SAVE it to tape by following the easy-to-read but not over-long instructions.

The effect of the compiler on the code is more marked in some instructions than others. The CIRCLE and DRAW commands are not much faster than in Basic, although if you draw sufficient circles you should see the speed compared to Basic.

The real effects of the compiled code will be noticed when you use FOR . . . NEXT loops and the other structural statements which affect the flow of a program. The speed in some cases is unbelievable when you think that the code used to be in Basic.

A compiler is a boon to anyone who can write Basic well but cannot master machine code. Unfortunately, the compilers in the Sinclair market and elsewhere incorporate some of the manufacturers' code into the code of a program when it is compiled.

That means that some of the manufacturer's program would be in your program and as a result you could not make a profit from your program without giving credit, and perhaps a royalty, to the software house which created the compiler.

Companies which produce compilers for more expensive computers, such as the Apple II, charge a hiring or rental fee for those utilities. In that way they receive money for any program which contains some of their compiler routines.

Unfortunately things are not so simple in the Sinclair market. It would be uneconomical to charge for compilers in that way, since mass production would mean keeping track of thousands of programs.

The initial stand was to insist that it would market programs which it thought were good and where the compiler was used. In no other cases could companies use the compiler without consultations.

At the time that was a difficult but necessary move, as there was, and still is, no clarification of the law of copyright regarding software. Softek has since softened its objections to the use of its compiler for profit and asks that companies which produce games using it credit Softek on the program and cassette insert.

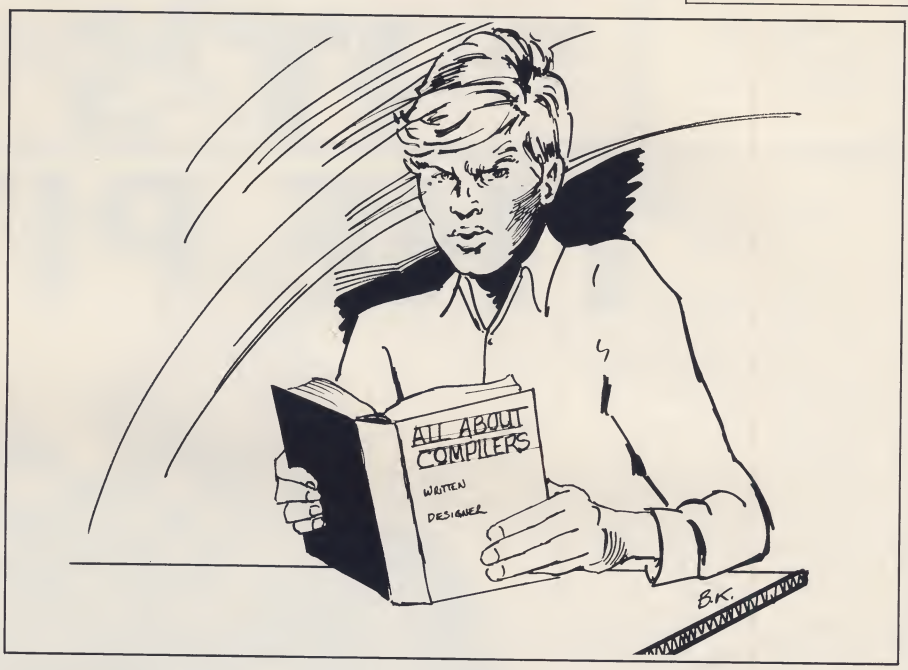
Compilers are useful instruments both to individuals and to software companies but the legal difficulties about their use still exists. Compilers become more complex and, as a result, companies which produce them will want to protect their interests from the usual type of piracy and the use of a compiler without consulting manufacturers.

It will need a change in the law to clarify the position but until then compilers will be of most use to individuals who do not want to take the step of learning to program in machine code. It is an unfortunate restriction of use which will need to be investigated in the near future.

Compilers are useful to the individual. Although they do not provide a complete translation from Basic to machine code they will still help anyone who does not want an assembler or to learn assembly code.

It may also provide an incentive to learn machine code programming techniques because of the speed at which it will make a former Basic program work. In the next few months we could see a 100 percent Basic compiler but until then we will have to work with what we have.

Softek, 12–13 Henrietta Street, London WC2.
PSS, 452 Stoney Stanton Road, Coventry CV6 5DG.



'Companies which produce compilers for more expensive computers charge a hiring fee for those utilities, but that would be uneconomical in the Sinclair market'

IT'S THE PITS



Deep in the bowels of the earth, in a dark, dingy mineshaft, lie 14 desperate men. They've been trapped by vicious rock falls, they're threatened by deadly gas, and it's your mission to rescue them.

Pitman Seven takes you to the very depths of your imagination and maybe back again. With two separate attack waves and three levels of play, only the strongest survive. The weakest are doomed to a tomb.

Pitman Seven. It's tough, it's challenging. And it's yet another great game from Visions. The ultimate name in video games.

Visions

FANS PLEASE NOTE! ALSO AVAILABLE MAIL ORDER
FROM VISIONS (SOFTWARE FACTORY) LTD
1 FELGATE MEWS, STUDLAND STREET, LONDON W6



PITMAN SEVEN VS-01-48



SHEER PANIC VS-03-16



SNOOKER VS-03-1/4

PROGRAMS WANTED

SPECTRUM DRAGON
BBC ZX81

WORK FORCE

THE BIGGEST LITTLE SOFTWARE HOUSE AROUND



DO NOT PASS GO

Now the SPECTRUM VERSION IS READY D.N.P.G. is a complete simulation of THAT BOARD GAME you know PARK LANE and all that. Up to SIX PLAYERS can compete with the MICRO doing all the work. Acts as DICE THROWER, BOARD, RENT COLLECTOR, UMPIRE, BANK, RULE BOOK, ACCOUNTANT, ESTATE AGENT and ASSET RECORDER. SUPERB GRAPHICS by GARRY KENNEDY (thanks mate). GAME SAVE with winner so far report. Complete with full instructions. The ULTIMATE in FAMILY GAMES. DON'T MONOPOLISE YOUR MICRO. AMAZE your friends and family. (Can you imagine your GRANNY on a MICRO?). A 16k ZX81 version also available. 48k SPECTRUM or 16k ZX81 versions **ONLY £6.95.**

YAHTZI 48K



48k SPECTRUM. All ELECTRIC VERSION of the classic dice game of STRATEGY. More CHUNKY graphics from GARRY KENNEDY. No extras required up to SIX PLAYERS can compete, or practise if you wish. SPECTRUM acts as UMPIRE, SCORE SHEET and DICE THROWER. Update your games cupboard for just **£5.50.** 48k only.

UP TO 6 PLAYERS £5.50

STOP PRESS
MORE SPECTRUM MAGIC

No time for the pictures all ready now!!!!

DOOM BUGS

We vote this game as the best arcade game submitted. REMEMBER that comfortable feeling when "IT ALL FELT RIGHT" and that ANTICIPATION before each NEW GAME. Well IT'S BACK and it really does FEEL GOOD. Trapped in GRUBBER'S LAIR the aim is to escape to the next level by eating your way through the trapdoor whilst being pursued by BUGS. BUBBERGRUBBERS and GRUBBER HIMSELF GREAT GRAPHICS, AGF JOYSTICK COMPATIBLE, FAST, TWO LEVELS and you are not going to believe how much fun it is. PRO-ARCADERS ONLY £5.50 for 16-48k version. ABSOLUTELY MAGIC!!!

THE WINGED AVENGER

Fast and furious Two versions of the same game on the SPECTRUM tape,, the original and the NEW VERSION. SOUND, GRAPHICS, SEVEN SKILL LEVELS. Full ARCADE ACTION including THREE WAVES OF ALIENS, HIGH SCORE, REFUELLING, RAPID REPEAT FIRING, SMART BOMBS and LASER SHIELD. P C W. "ONE OF THE BEST SINCLAIR GAMES YET" HOME COMP WEEKLY "FOUR STAR WINNER". 16k ZX81 VERSION "PROBABLY THE FASTEST ZX81 GAME" NOTED as EXCELLENT by the INTERNATIONAL BUREAU OF SOFTWARE TEST. 16k ZX81 & 16+48k SPECTRUM VERSIONS AVAILABLE. **NOW £5.00.**



NEW RELEASE
"JAWS REVENGE"
48k SPECTRUM

Disappointed with his box office returns JAWS brings his GORY EATING HABITS to the SPECTRUM in his very own ARCADE GAME. JAWS eats his way through a mixed diet of DIVERS, BOATMAN, JELLYFISH SWIMMERS and FISH You control JAWS in this FAST MOVING trail of carnage. Avoid DEPTH CHARGES, EXPLODING JELLYFISH, HARPOONS, ARMED SCUBA DIVERS and EAT everything you can. 5 LIVES, SCRAMBLE type SEA BED, current and HIGH SCORE. ALL MACHINE CODE and FAST. DEMO SCREEN. BONUS LIVES. FASTER GAME FOR 10,000 POINTS. WREAK HAVOCK ON THE HUMAN RACE "THE BEST GAME YET" ANIMAL RIGHTS MOVEMENT". 16 & 48k SPECTRUM **£5.00.**

MATCALC
16 & 48k SPECTRUM

This is our SPREADSHEET PROGRAM with a difference. This ONE has the option of the standard display or a 64 CHARACTER per LINE display or printout. Ideal for WHAT IF, CASH FLOW PROJECTIONS, and analysing related figures. FORMULA may be MATHEMATICAL or LOGICAL. MENU DRIVEN. SAVE and LOAD to TAPE. FULL instructions and TWO matrices on TAPE with a full explanation of their formation. P.C.W. "MORE FLEXIBLE overall than . . . ". Both the 16k & 48k versions on ONE TAPE. SIMPLY HUNDREDS OF USES. **JUST £7.00.**

"SHIFTY" 48k SPECTRUM

A WORD PROCESSOR FOR THE SPECTRUM. "SHIFTY" was designed to overcome the limitations of the standard SINCLAIR HARDWARE, specifically the PRINTER. Using the STANDARD PRINTER all output over 32 CHARACTERS PER LINE is PRINTED SIDEWAYS allowing pages to be formatted from the printer paper. Any width from 20 to 80 characters per line may be specified. Text can be viewed prior to printing and can be JUSTIFIED to the RIGHT MARGIN. SHIFTY will WORD SEARCH, MOVE PARAGRAPHS, SPLIT PARAGRAPHS, APPEND PARAS, SAVE and LOAD from TAPE, INDENT PARAS and allow standard PHRASES to be STORED and accessed from DATA STATEMENTS using DEFINED KEYS. EDITING is ON SCREEN using 4 way CURSOR MOVE. SHIFTY comes complete with a sample letter and full instructions. Requires ZX printer. **ONLY £7.50.**



ENIGMA

This one's for THINKERS ONLY. Based on the BLACK BOX principle a game with PURE RULES and requiring a high degree of REASONING and DEDUCTIVE SKILLS. Each game lasts HOURS and becomes PROGRESSIVELY more DIFFICULT. It's a PUZZLE why it's so CHEAP at £5.00.

PIRATE ISLAND

WANTED ADVENTURE FREAKS. Join forces with THE PIRATE and search the ISLAND for the TREASURE. A FAST RESPONSE program ABSOLUTELY NO RANDOM FEATURES. Can you trust a PIRATE. There's BUT ONE WAY to FIND OUT. FOR £5.50 you get a whole ISLAND full of TREASURE, TRAPS, RED HERRINGS and many hours of FRUSTRATING FUN. A TRADITIONAL ADVENTURE. 48K ONLY.

WORK FORCE GIVE-AWAY

3 WELL REVIEWED MACHINE CODE ARCADE GAMES on one tape as a SAMPLER. HIGH NOON and BASE INVADERS were rated as the best versions available and SCRAMBLE even beat the reviewers when they tried it.

BASE INVADERS
THREE SPEEDS the fastest INVADERS. HIGH SCORE and SHIELD AVAILABLE if you CAN'T HANDLE the ACTION.

HIGH NOON
SMOOTHIE GRAPHICS, FAST ACTION and GOOD SOUND. The best COWBOY SHOOT OUT.

SPECTRUM SCRAMBLE
EIGHT DIRECTIONAL MOVEMENT. LASERS, BOMBS, ROCKETS, INSTANT RESPONSE, CONTINUOUS SCORING, SOUND, FUEL DUMPS, RED METEORS, DEFENDER CRAFT and HIGH SCORE. Classic arcade action.

Threse PRO-ARCADE GAMES worth £13.95, yours for £6.50 LESS THAN HALF PRICE. THE BEST VALUE EVER FOR 16 & 48k SPECTRUM.



DISPLAY

How would you like 273 different USER DEFINED GRAPHICS on a 16k SPECTRUM or a FULL 336 on a 48k. All can be displayed on screen at the SAME TIME. U.D.G's are stored as PAGES and any two pages may be EXCHANGED in MEMORY. FILES may be SAVED or LOADED from TAPE at a USER specified location. TURN a UDG one quarter or half turn. FLIP a UDG over, REVERSE a UDG, EXPAND a quarter UDG into a FULL CHARACTER. MOVE a UDG one PIXEL at a TIME, UP, DOWN, LEFT or RIGHT. FIVE complete TAPE FILES are INCLUDED on tape ONE CONTAINING a 64 CHARACTER DISPLAY. DESIGN GRID for constructing CHARACTERS and SHAPES. FULL INSTRUCTIONS and ANIMATED DEMO SCREEN. **£7.00.** 16 & 48k SPECTRUM.

PROGRAMMERS DREAM
16k or 48k SPECTRUM.

An advanced SPECTRUM TOOLKIT. Comprised of just 1450 BYTES of POSITION INDEPENDENT MACHINE CODE. RENUMBER lines or blocks. Allows START, FINISH, INCREMENT and new START to be defined. BLOCK or line MOVE including RENUMBER to fit available GAP. RENUMBER will renumber ALL GOTO, GOSUB; LIST etc without further action. CHANGE strings (NAMES or CONTENTS. DUMP VARIABLE NAMES and CONTENTS to DISPLAY PROGRAM SIZE with or without VARIABLE SIZE. This package is FAST, CLEAN, PRODUCES ERROR MESSAGES and is WELL DOCUMENTED. S.USER "WORKS LIKE A DREAM" SPECTRUM ONLY **£6.95.**

ZX-81 16K USERS IMPORTANT ANNOUNCEMENT

WORK FORCE now appointed as U.K. distributor for VENTAMATIC SOFTWARE of SPAIN. 6 of the BEST PRO-ARCADE games LAUNCHED NOW!!. SPECTRUM FOLLOWS. "STATE OF THE ART" for PRO-ARCADERS ONLY. Special launch offer each TAPE contains 2 MACHINE CODE MASTERPIECES for JUST £4.50. NO RUBBISH.

DANGER TRACK

RACE a CAR through a maze 30 times larger than screen. Collect 10 FLAGS, BEWARE 5 ATTACKERS, THROW SMOG BOMBS. ON SCREEN RADAR MONITORS WHOLE MAZE. SPECIAL RESOLUTION.

AND

BUMPER THUMPER

PURSUED by the CHASER you have to PUSH the THUMPERS off SCREEN. All BLOCKS are SLIDERS but don't go near the CHASER or you get "YOUR BUMPER THUMPED" GOOD GRAPHICS.

PHANTOMS

PHANTOMS a HAND CRAFTED version of "...MAN" TWO LEVELS of PLAY, THREE MAZES, ENERGY DOTS, POWER PILLS, FRUITS, FOUR GHOSTS, ESCAPE CORRIDORS, and GREAT GRAPHICS. PRO-ARCADERS only NO FUMBLERS.

AND

CASHBOOT

A MANIC BOOT driven relentlessly by MACHINE CODE. LEAP from square to square knocking out FLAGS. BEWARE the BOOT crashing around. One false move and it's "cobblers" for you. SPECIAL GRAPHICS, HIGH SCORE and several screens.

SPACE BATTLE

PURE MAGIC. Complex 3D GRAPHICS. Unlimited galaxy. STARFIGHTERS attack at SPEED in 3D. 3 Keys GIVE 8 directions. 4 to 6 IMAGES per SECOND. 9 to 10 depth PLAINS. The BEST RESOLUTION at THIS SPEED. YOU HAVEN'T SEEN A PROGRAM THIS GOOD.

MOONLANDER

CLASSIC ARCADE GAME only this one's for PROS ONLY. 2 STAGES of RESOLUTION. SELECTABLE LEVELS of "GRAVITY. MACHINE CODE gives instant CLOSE UP of LANDING. PRECISE CONTROL AND FINE GRAPHICS. The HARDEST YET. NO BEGINNERS PLEASE.

WORK FORCE

140, WILSDEN AVENUE
LUTON BEDS.

Post Included

odyssey computing

HIGH RESOLUTION ZX81 PROGRAMS

We utilise a SOFTWARE ONLY technique developed by Steve Briers BSc to produce a stable 248 by 224 pixel display. ABSOLUTELY NO HARDWARE MODIFICATIONS ARE REQUIRED for the following programs:

INVADERS —reviewed ecstatically in 'ZX Computing'—"the Hi-res display really does break new ground . . . an excellent game . . . an outstanding achievement . . . As well as the Hi-res display the facilities offered are impressive"—Need we say more!?

SWARM —a fast moving arcade-type game. Shoot down saucers as they dart across the screen firing their missiles. Progressive difficulty.

ZORF —an advanced arcade game incorporating five different sheets:— INVADERS, GALAXIANS, ZORFIANS, METEOR STORM, & MOTHERSHIP; progressive difficulty.

GRAPHICS —enables you to use high resolution graphics in your own programs. The commands are: CLS, PRINT, PLOT, POKE, DRAW, SPRITE & SCREENOFF. Comprehensive editing facilities are provided and the graphics commands are easily incorporated into BASIC programs.

CAVE CRUSADE—please note that this does not use high resolution graphics, however, the normal graphics are used to good effect. This is a fast moving game in which the player must escape from a cave whilst being persued by its ferocious inhabitants.

NEW! — FOR THE 48K SPECTRUM

SPECTRUM ZORF—similar to our ZX81 program but using colour and sound. This is in fact five games in one, as the player can choose to play one sheet continuously if so desired.

CHILD'S PLAY—designed as a teaching aid for pre-school children with the participation of a parent or teacher. Excellent use made of the Spectrum's colour graphics makes this an enjoyable program to use.

(We are constantly looking for quality Spectrum software for which we pay up to 33% royalties. If you've written such a program then send a sample to us for evaluation. Trade enquiries are welcome).

Send this coupon to ODYSSEY COMPUTING, 28 BINGHAM ROAD, SHERWOOD, NOTTINGHAM NG5 2EP. Tick the programs you require.

__ Invaders	£4.95	I enclose a cheque/postal order for £ made payable to ODYSSEY COMPUTING.
__ Swarm	£3.95	
__ Zorf	£5.95	
__ Graphics	£5.95	NAME.....
__ Cave Crusade	£3.95	ADDRESS
__ Spectrum Zorf	£5.95	
__ Child' Play	£5.95	

New Low Prices

SPECIAL OFFER available to 30th November or whilst stocks last.

SPECTRUM GAMES 16 or 48K

Jet Pac	£4.99
Cyber Rats	£5.50
Black Hole	£4.99
Invaders	£4.50
PSSST	£4.99
Slippery Sid	£5.50
Tranzam	£4.99
Planet of Death	£6.50
Jumping Jack	£4.99
Light Cycles	£4.50
Violent Universe	£4.99
Cookie	£4.99
E.T.X.	£5.50
Arcadia	£4.99
Nightflite	£5.50
3D Tunnel	£5.50

48K only

Hobbit	£13.99
Mad Martha	£6.50
Penetrator	£6.50
3D Combat Zone	£5.50

IMPORTANT

Your discount vouchers are still valid. Existing customers can now save up to £1 a game.

NEW! THE ZX PRINTOUT BINDER

Special introductory offer: 1st 200 at only **£4.99** plus £1.00 postage and packing. A smart 4 ringed red leatherette binder custom built for your printouts. Complete with 5 heavy gauge clear PVC sleeves. Additional sleeves in packs of 10 at £2.99 plus 50p postage and packing.

Binder ☐ **Sleeves** ☐

See us at the 9th ZX Microfair.

Send cheques or P/O's to (no stamp needed):

K-ram,
Freepost,
Rainham,
Essex RM13 7BR

Name.....

Address

.....

.....

k-ram

J. K. GREYE ENTERPRISES LTD

NEW



FOUR STAR

16/48K SPECTRUM

Includes games to suit all ages, from 5 to 105

INVASION: Our version of the Classic Arcade Game, surely one of the best around. Includes Full Colour High Res. Graphics, Sound and it's incredibly fast at the end.

KAMIKAZE: If you like Scramble, you'll love this. 16 levels (long ones at that), of tortuously twisting caverns, Missiles, Starmines (which move in between games, so it's never the same next time around), Bases, Fuel Dumps (watch you don't run out of fuel!), and two speeds (difficult and impossible). Definitely a game for those amongst you with a suicidal tendency, when playing games, because you can score even when you crash! (If you can make it past level 8, write and let us know, 'cause that's as far as we've managed!).

MINEFIELD: A totally new game, in which you have to lay mines in a forest. Sounds simple doesn't it? But, once you start, you can't stop and there lies the rub (or to be more exact the explosion!). Guaranteed to get your fingers in a twist!

UFO: Dodge the Asteroids, blast the Alien Craft and work off your aggressive instincts on the keyboard. Gets progressively more difficult the longer you last!

All of these for only **£4.95**



GAMESTAPE 1

1K ZX81

10 Games incl. ASTEROIDS, UFO, CODE, BOMBER, GUILLOTINE, KALIEDESCOPE, etc.

PROBABLY THE BEST VALUE 1k TAPE AVAILABLE. We've done it 1k games which some of our competitors require 16k to do!

only **£3.95**



GAMESTAPE 2

16K ZX81

***STARFIGHTER** Superb machine code Space Battle, set against a background of twinkling stars, with stunning explosions - if you can hit the enemy!

PYRAMID Can you move the Pyramid? Make a mistake and it will collapse! A thinkers game.

ARTIST The ultimate Graphic Designers aid. 8 Directions, 10 Memories, SAVE, COPY, RUBOUT, CLS, etc.

only **£3.95**



GAMESTAPE 3

16K ZX81

***CATACOMBS** A Multi-Level Graphics Adventure. Each level can contain up to 9 Rooms, 8 Passages, 7 Monsters, Food, Gold, Traps, Phantoms, an Exit (to the next level), and there's an infinite number of levels.

NOTE - This is NOT one of the necessarily limited text Adventures as sold elsewhere

"An excellent addictive game which will keep you amused for hours" ...COMPUTERS & VIDEO GAMES

only **£4.95**



3D VORTEX

16/48K SPECTRUM

After a successful warp transfer, you drop your craft below light speed, only to discover you are caught in the irresistible gravity well of a giant Neutron Star. You are dragged past the Event Horizon, and then the fun really begins! Gravitic Tidal pressures have created a mind boggling Vortex through the tortured supra-matter of the Neutron Star. And guess who's caught in it? The onboard Navigational Computer copes for a while, but what mere machine can withstand the awesome forces inherent in such an anomaly. Soon the Nav.-Com. will cease functioning, and then (of course), it's all down to you.

Are you capable of "seat of the pants" flying, it won't be easy? Not only does the Vortex twist and turn, like some demented worm, but your Tau-Sigma Shield will only withstand 10 contacts with the boundary layer. And, as if that wasn't enough, you have to dodge, or laser, the Octoplasms, Droids and Sirius Class Battlestars, Best of luck! You'll need it!

Features

Stunning 3D Graphics.
Full Sound Effects.
High Speed Machine Code Animation.
Full Instructions.
Choose your own Control Keys.
Compatible with most Joysticks.

only **£5.95**

If you prefer to see before buying, our range of Gamestapes are stocked by W.H. Smith, John Menzies and good computer stores Nationwide.

TRADE & EXPORT ENQUIRIES WELCOME

SOFTWARE SUCH AS DREAMS ARE MADE OF

Please tick boxes of required tapes:

3D VORTEX	at £5.95 ☐
FOUR STAR	at £4.95 ☐
GAMESTAPE 1	at £3.95 ☐
GAMESTAPE 2	at £3.95 ☐
GAMESTAPE 3	at £4.95 ☐

All software sold subject to the condition that Hiring, Lending, Unauthorised copying or Resale is Strictly Prohibited

Send your order to:
J.K. GREYE ENTERPRISES LTD.
16 Park St. Bath BA1 2TE

Name

Address

.....

..... Postcode

I enclose a cheque/p.o. for £.....
made payable to **J.K. GREYE ENTERPRISES LTD.**

fantasy

The battle could be yours.....
.....but it won't be easy!

PARTICIPATION – that is the name of OUR game. All our software contains a unique score verification mechanism allowing us to add a new dimension to computer games. Every July and January we will be publishing a ranking list of the top 1000 scorers in each game with the overall top 100 'grand masters' each receiving certificates of merit bearing their position.

September is the last month to qualify for the Black Hole championship. However, from October the sender of the highest valid score each month will win software of their own choice to the value of £50.

The Black Hole is a technicoloured confection of special effects...very demanding; magnificent graphics. (Soft)
The explosion effects are some of the best we have seen.
...(Sinc User)



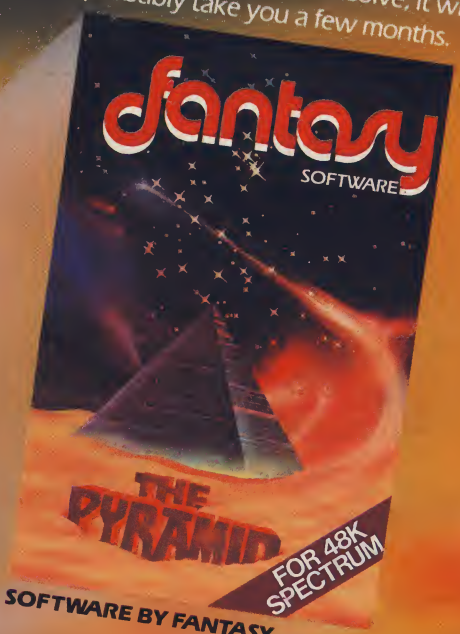
SOFTWARE BY QUEST

Totally original game plan. Addictive, challenging and offering a complete visual experience with its animated graphics and violent explosive effects. Compatible with ALL leading joysticks.



SOFTWARE BY QUEST

If you are looking for something that v keep you up all night, cause you to pu your hair out, send you mad with its trickery, then you really shouldn't miss this game.
The mystery of "THE PYRAMID" won't take you a few days to solve, it will probably take you a few months.



SOFTWARE BY FANTASY

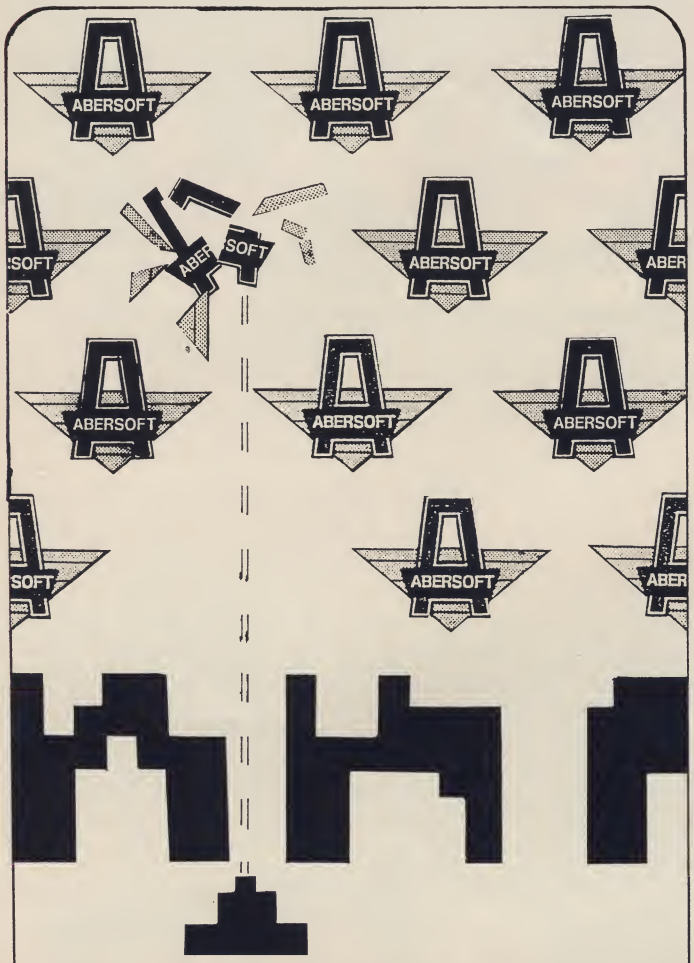
FANTASY SOFTWARE is available from W.H.Smiths, John Menzies and Computers For All

FANTASY...
...a name to remember

ASK FOR FANTASY SOFTWARE at your local SOFTWARE RETAILER

All games are obtainable at £5.50 each from
FANTASY SOFTWARE, FAUCONBERG LODGE, 27A ST.GEORGES ROAD, CHELTENHAM, GLOS GL50 3DT
despatched by return first class post together with a membership number entitling you to discount on our forthcoming blockbusting software.

Trade Enquiries welcome – telephone 0242-583661



We make other games as well.*

SPECTROID STORM: A fast action graphic space game. You dodge asteroids and zap aliens in this cosmic battle for the stars. There are bonus points to be scored for the sharp shooter with the speedy ship. The whole of hyper-space lies waiting for you when you pile on the super thrust. Spectrum £4.45 NEW

THE WIZARD'S WARRIORS: A fast moving game featuring continuous sound effects and arcade quality graphics. Spectrum £4.95
'a well written graphics adventure!'
... *Home Computing Weekly* ...

ADVENTURE ONE: With save game facility. Spectrum £6.95
'a remarkably good version ... well worth the money.' ZX81 £5.95
... *Sinclair User* ...

MAZEMAN: ...NOW AVAILABLE FOR THE LYNX £4.95
A fast action machine code game. Spectrum £4.95
'... is very accurate and fast.' ZX81 £4.45
... *Which Micro* ...

CHESS: Ten levels of play. Good graphic display.
'... in a class of it's own.' ZX81 £5.95
... *Your Computer* ...

INVADERS: Very fast m/c action. Includes mystery ship and increasingly difficult screens. ZX81 £4.45

*if not better

ABERSOFT DEPT S1 Access

7 MAES AFALLEN, BOW ST, DYFED, SY24 5BA

Dealer enquiries are welcome

24hr Ansaphone 0970 828851

TRANSFORM LTD.

Business Software

FOR SMALL BUSINESSES AND THE SELFEMPLOYED

Business Bank Accounts
This program enables you to make debits under 11-15 sub-headings. Statements includes totals of all subheadings.
ZX 81 £8.75 ZX SPECTRUM 48K £10.75

Sales Day Book.
For all your invoices, this program will enable you to prepare statements of oustanding invoices. Program will also calculate VAT.
ZX 81 £8.75 ZX SPECTRUM 48K £10.75

Purchase Day Book.
Keeps a complete record of all your purchases under 11-15 subheadings. This program will also calculate and deduct VAT.
ZX 81 £8.75 ZX SPECTRUM 48K £10.75

Business Packs.
Incl. Bank Account, Sales, Purchase & Quarterly Analysis program.
ZX 81 £25.00 ZX SPECTRUM 48K £30.00

Stock Control.
Handles 900 lines, includes details of supplier. Program has full search facilities enabling you to search & update all lines from one supplier. It is also possible to deduct items from stock
ZX SPECTRUM 48K £10.75

Invoicing.
This Program will print out invoices, calculate discounts and VAT The program will calculate totals from unit prices, giving the discription of each unit price
ZX 81 £15.00 ZX SPECTRUM 48K £15.00

Word Processing by Tasman
Tasword Two is a powerful word processing program that will perform all the functions available on large word processors. The program will give you on screen 64 characters per line.
ZX SPECTRUM 48K £13.90

Masterfile by Cambell Systems
This is one of the best data systems available for the ZX Spectrum This program has many uses in a small business.
ZX SPECTRUM 48K £15.00

Dlan by Cambell Systems
Use your Spectrum to sell your products. Dlan will display your message in up to 11 different typefaces. Will scroll in any direction
ZX SPECTRUM 48K £7.95

64 Column Generator by Tasman
You can use this program within your programs to display 64 columns of screen
ZX SPECTRUM 16-48K £5.50

Payroll by Byte One
This payroll program will handle upto 40 employees and can calculate N.I.C., PAYE, superannuation and many other deductions This is a very user friendly program and extremely good value.
ZX SPECTRUM £19.95

Superplan by Video Software Ltd.
This is one of the best speadsheet programs, up to 52 columns full colour display capacity exceeds 40,000 digits.
ZX SPECTRUM £12.00

All the above programs include VAT, post and packing. A VAT invoice will be sent with all purchases.

PRINTERS.

All the above programs will now run on a full size printer, we can now offer you a complete package including interface and printer.

Centronics interface for ZX Spectrum	£39.14
Seikosha GP100A printer	£178.25
Star DP510 printer	£252.00
Epson FX80 printer	£381.60

Many other printers available send SAE for details on software and printers.

Please add VAT to the prices of printers and interfaces and £5.00 for postage of printers.

TRANSFORM LTD.
41 Keats Ho Porchester Mead Beckenham Kent
Tel: 01-658 6350

THE FULLER BOX

The Sound System for the Spectrum

The FULLER BOX added to the ZX Spectrum, improves the sound quality enormously. The built-in audio amplifier working well with all SPECTRUM programs.

The FULLER BOX allows you to program your own music, explosions, zaps, chimes, whistles and an infinite range of other sounds. Based around the popular G1-AY-3-8912 sound chip. It gives you complete control over 3 channels of tone and/or white noise, plus an overall envelope control.

Also provided with a joystick port, the unit gives instant command over all your own games programs. The port is compatible with all the commercially available joysticks eg. Atari/Commodore.

The FULLER BOX is complete with full documentation and a demo tape which includes the type of sounds you can achieve. It also allows you to program your own sounds. Fitting neatly onto the back of the SPECTRUM, the FULLER BOX still allows access for other peripherals, including the new SPECTRUM Micro Drives, via its duplicate user port.

Certain Imagine, Arctic and A&F games now with speech and sound effects.



£29.95
(inc. VAT)+ 80p P&P

The Fuller Experience.

Firmly established in the development of computer hardware, the acknowledged leaders in their field, the vast range of Fuller experience is available to you through their comprehensive selection of accessories. This ever expanding range makes Fuller the natural extension for your Computer.



£39.95
(inc. VAT)
+£2.50 P&P

THE NEW FDS for the SPECTRUM, ZX81, LAZER 200, JUPITER ACE,

This elegant desk top system, designed for the professional user. In its slimline case, the superior keyboard contains all the graphic characters for the above computers. With the additional function keys and SPACE-BAR, speedy and accurate data entry is made simple.

The Fuller FDS is easy to install, based on the very popular FD42 system, it requires no soldering or technical knowledge. For the user who is reluctant to install his computer circuit board inside the FDS a buffer is available (£9.75 + 80p&p) which simply plugs onto the expansion port and connects directly to the keyboard.

The Fuller Orator – Speech for the Spectrum

A smash hit at a number of recent Micro Fairs, the FULLER ORATOR uses an allophone system. Based on the G1-SP0256 AL voice synthesiser chip. Directly accessable in BASIC, it is able to say anything you command using the keyboard or a games program. It comes in the standard case complete with its own audio amplifier, it allows access to the SPECTRUM for other peripherals via its duplicate user port. Full documentation and demo tape included.

PRICE (inc. V.A.T.) **£39.95** plus 80p p&p.

THE MASTER UNIT — The Ultimate Games Unit

The Master Unit provides all the requirements for the serious games enthusiast, containing not only the FULLER BOX, but also the FULLER ORATOR, all contained within the standard case. The Speech Unit and sound synthesiser combines to provide exciting voice and sound for your games. The other features include, Cassette interface, a variable audio output which may be connected directly to a HI-FI system. The MASTER UNIT provides endless scope in applications, and it allows access to the SPECTRUM for other periferal, via its duplicate user port, i.e. printerface. The MASTER UNIT is complete with full documentation and demo tape which includes the type of speech and sound you can achieve.

£54.95
(inc. VAT)
+ 80p P&P

Please supply the following items: (state items and quantity) SU11

plesase send me @ £.....

please send me @ £.....

please send me @ £.....

please add £.....for p&p

I enclose a cheque/PO payable to
FULLER MICRO SYSTEMS Total £ or debit my Access/

Barclaycard – Card No. [][][][][][][][][][][][][][][]

Signature

Name

Address

.....

DEALERS REQUIRED FOR UK & ABROAD ENQUIRES WELCOME

051-236 6109

71, DALE STREET, LIVERPOOL 2

MICRO SYSTEMS
Fuller

FULLER MICRO STSTEMS
The ZX Centre, Sweeting Street,
Liverpool 2. Telephone: 051-236 6109

Fuller Quality
Fuller Micro Systems reach for the highest quality in Research and Development, to make our products the BEST.

Fuller Service
In an effort to provide the best service we have built a new MAIL ORDER dept. at 71, Dale Street, Liverpool 2. Due to come into service soon.

Fuller Guarantee
All our products carry a worldw...e one year guarantee.

FULLER stock a full range of components and kits for your, computer, send SAE for details.

Adaptor opens up the Micronet world

Spectrum users can now take advantage of a growing database. Stephen Adams reports on the hardware which makes it possible

THE PRISM VTX 5000 modem has been designed to give Spectrum users access to the Micronet 800 closed-user database on Prestel. It consists of a flat, black box slightly bigger than the Spectrum on which the Spectrum rests, connected to the modem via a three-plug ribbon cable. The cable connects the Spectrum and modem and provides an expansion connector for other peripherals like the printer. If you are using Interface 1, connect it to the interface connector.

On the front of the modem are two switches and two LEDs. The red LED is the power-on light and the green LED indicates to the user that the modem is connected via the line switch to the telephone line. The second switch allows you to select the mode to be used — Micronet terminal, half-duplex transmitting terminal with echo, or receiving terminal. The Micronet terminal works at 1,200 baud receive and 75 baud transmit to Prestel. The other terminals work at 1,200 baud both ways.

The connection to the telephone line is via a new-style jack plug and socket fitted by British Telecom. At present the cost of fitting it is being included in the price of the adaptor. The telephone is fitted with a plug on the end which plugs into the back of the modem or the wall socket.

The modem is approved by British Telecom but has no auto-dial facility, so the telephone must be used to dial the Prestel computer before the modem is switched-in. As long as the LINE switch is in the correct position it will not effect the use of the telephone and the unit can be left connected all the time.

The unit has two printed circuit boards, one to interface to the microcomputer and one containing the modem and isolation circuitry. The modem is a Texas one-chip modem type TCX3101 controlled by a 4.4MHz PAL colour frequency crystal. It has two amplifiers between it and the line and provides various handshaking signals to the communications interface chip via a 10-wire interface cable.

The board also contains an isolation transformer and a reed relay to hold a telephone call when the handset is replaced on the telephone.

The Spectrum interface board contains an 8251 communications chip, 8K EPROM, baud rate oscillator and various decoding chips which allow it to switch-out the 16K Sinclair Basic ROM and replace it with its own.

Various speeds are available, the RS232-type interface being marked from 75 to 2,400 baud, but the board is connected to work only at 1,200 or 75 baud. The chip is operated by a 0 on bit 7 of an I/O address but checks the lower five bits to see if a Sinclair device is requested. That may affect some other devices like joysticks, which also use that method of addressing.

> 'Instructions with the packages are simple and easy to understand'

On powering-up the modem and Spectrum — the modem is powered from the Spectrum via a voltage regulator by turning it on at the mains plug — the modem switches in the 8K EPROM and loads a Basic and machine code program from the ROM into RAM. It also loads a new Prestel graphics set above RAM TOP. A warning is printed in the front of the manual about not powering-up by plugging-in the power socket to the back of the Spectrum when using Interface 1 — the Microdrive interface. Do not ignore it as some damage may occur if you do.

The Basic program then RUNs and presents the user with the Micronet 800 logo, which also gives the software version number and date. Pressing a key will then get you on to the main menu, one of five used to control the system.

That gives seven functions and is returned to for SAVEing and LOADing software from Prestel, saving, printing or viewing frames — each page is called a frame — entering other menus or entering or leaving Prestel.

Option one lets you log-on to Prestel after inserting your identity number and password into the computer. That may be done before or after obtaining Prestel. The number is issued by Prestel via Micronet and is the one by which you are charged, so do not let anyone else have the number or they could incur large bills which you would have to pay.

To contact Prestel dial the number for the local Prestel computer — it will always be a local number to save cost to the user — and wait for the computer to answer with a high-pitched tone. Then throw the line switch on the modem and replace the handset on the telephone; that prevents noise from the telephone corrupting the data.

The control of the telephone line is then with the Spectrum. You are then ready to use Micronet 800, from whose page you start, or other open Prestel facilities. Micronet and other closed databases are restricted to members who pay a subscription to join. In the case of Micronet it is £52 per year.

Micronet 800 provides facilities for exchanging messages with other users, including the Information Providers; ordering goods; downloading free programs; or buying programs which are downloaded to you over the telephone. There are also various news and information pages on BBC and Spectrum machines.

The present database of free programs seems to be made up of programs seen in *Sinclair User* and the amount of programs for sale is limited. There are two 16K programs and about 10 48K programs and none of the famous names is among them either.

None of the major software houses for Spectrum software seem to want to use Prestel to sell their programs but that may change as more users log-on from Spectrums.

The Prestel page is 40 columns by 24 lines and so the character set has been altered to give the smaller characters



required, as well as re-defining the graphics characters. Various features also allow you to specify colours and use FLASH or REVEAL functions.

The page number is always printed at the top with the price of the page and what kind of page it is — in this case Micronet 800. At the bottom of the page is anything you type-in at the keyboard.

Only numbers, the two SHIFT keys, and ENTER are recognised. To get out of any frame press CAPS SHIFT and ENTER, which will return you to the main menu, from which you can get back to Basic by pressing 7.

Any of the frames can be copied to the Sinclair printer, stored in RAM or on tape. The screens are stored as a single DIMensioned variable B$(600) and are SAVEd and LOADed as DATA. The terminal software uses normal 32-character Spectrum screens for the menus.

The frames for programs have the first two pages as an introduction and from page number c onwards they consist of the data stored in CET format at about 850 bytes per frame. Micronet always starts loading from page c until the last page unless it is told by the user from the downloading menu.

When LOGging OFF Prestel, a response page is printed if there are any messages in the mailbox for you. You then have a choice of reading them, erasing them or storing them on tape like any other page.

Using Prestel can become very boring, as the only facilities you have are the numbers 0-9, the SYMBOL SHIFT key — used as * — and the ENTER key — used as #. To work your way through to a particular page you can either go direct to the page, if you know it, by * Page number #, or by using one key to select from a menu the next descending menu, until you reach the page you want.

All the time you are doing that you will be charged for the price of a local telephone call. If you intend to use Prestel a good deal it is worth storing some of the index pages on tape via the Save Frame facility, as they can allow you to pick up the correct page immediately.

As the control program is written in Basic it would not be too difficult to alter it to do a search of Prestel for the information you want, or to call a certain page automatically.

That would certainly speed the access to the information and save money on telephone bills. That kind of program would have to be SAVEd on tape, as the original program would be installed on switch-on.

You do not have to be connected to Prestel to view pages stored on tape and the terminal software allows you to leave Prestel and do something on the computer and then return to it where you left off. That will happen also when you download software as it over-writes the Basic program.

To return to Prestel you type RAND USER and then a number, which depends on whether you own a 16K or 48K Spectrum. The only way to leave Prestel is to LOG OFF on the main menu or by changing the LINE switch. For this a computer can be connected between 8am and 6pm from Monday to Friday and between 8am and 1pm on Saturday. An additional fivepence a minute will be added to the normal local telephone charge. More details can be found on page 123 on Prestel or by telephoning Freephone 2043.

The instructions with the package are simple and easy to understand, with plenty of pages reproduced by a Sinclair printer. The only facility not mentioned is the two terminal facilities, TX and RX. TX allows you to send data and programs at 1,200 baud to another user using a 1,200 baud modem. Any data sent is also echoed to the Spectrum for printing on the screen, which is a useful way of checking it is working. You can transmit only in this mode and cannot see anything sent to you.

The RX mode is the same as the TX mode, except that any characters typed-in are not echoed, but are lost. So to talk to another user you must move the switch constantly from TX to RX and back again. There is a software switch for it but at the moment there is no software to run it.

Micronet 800 and the Prism VTX 5000 modem allow you access to the database, at a price. The cost of the modem is £74.95 plus £13.15 per quarter plus VAT.

For that you get access to Prestel and Micronet 800; a free jack socket is fitted within 72 hours by British Telecom where your telephone was sited. Also the telephone has a new cord to allow it to plug into the socket.

Those charges are made quarterly, so it would be better to keep a note of how much time you spend and when, as you go along, so you do not receive a massive bill.

The usefulness of having all this information on tap 24 hours a day, seven days a week, will depend on how much it costs to get it and what is available. On Micronet the information side is just getting started for the Spectrum and the cost is high.

Prestel has more information in it, as it has been operating longer, and information on airlines, railways, pubs, clubs, theatres in any area of the country could be very useful if you want to make a reservation.

The more people who use the system, of course, the better the system becomes and possibly the cheaper it becomes.

The VTX modem provides the key to the door and I had no problems using it which were attributable to the modem. It is for users of the system to explore this new world like an adventure game, publishing the interesting pieces — and the annoying ones — for everyone else to see.

Using the mailbox facility, messages could arrive by Micronet and not by post in the near future, taking seconds instead of days. It could also solve the commuting problem by you doing your work from home via a Prestel terminal.

Micronet 800 is at Scriptor Court, 155 Farringdon Road, London EC1R 3AD. Tel: 01-278 3143.

WHEN YOU BUY FORTH MAKE IT THE BEST!

"Forth is closer to machine code and more than 10 times faster than BASIC. A game of Space Invaders written using it would be almost as if it is written in machine code." Sinclair User. ● "Abersoft Forth has no known bugs, gives you more Forth words, and because it allows 12 screens in memory at once it is easier to load and save programs." Personal Computer News. ● "Abersoft Forth is a complete version of the language with added colour, attribute and graphics instructions. It is also possible to define your own characters just as you can in Spectrum BASIC." S.U. ● "Forth is an easy language to use, and the graphics commands in Abersoft Forth allow you to do anything in Forth that you can do in BASIC." P.C.N. ● "Abersoft Forth is the only Spectrum package which has been endorsed by the Forth Interest Group." S.U. ● "Its features make it well worth the price." P.C.N. ●

FANTASTIC

TEACH YOUR SPECTRUM A NEW LANGUAGE

M

MELBOURNE HOUSE



Melbourne House Publishers

SPECTRUM Books

- ☐ Understanding Your Spectrum NEW LOW PRICE £6.95
- ☐ Spectrum Machine Language for the Absolute Beginner NEW LOW PRICE £5.95
- ☐ Over The Spectrum NEW LOW PRICE £4.95
- ☐ The Complete Spectrum ROM Disassembly £9.95
- ☐ Spectrum Hardware Manual £5.95
- ☐ Spectrum Microdrive Book £5.95
- ☐ Supercharge Your Spectrum £5.95
- ☐ Please send me your free 48 page catalogue

48K Spectrum Cassettes

- ☐ Penetrator £6.95
- ☐ The Hobbit £14.95
- ☐ Terror-Daktil 4D £6.95
- ☐ Melbourne Draw £8.95
- ☐ H.U.R.G. £14.95
- ☐ Computer Bridge £8.95
- ☐ Abersoft Forth £14.95

All prices include VAT where applicable. Please add 80p for post and pack.

£	
£ + p/p .80	
Total £	

I enclose my cheque/money order for £

Please debit my Access Card No. Expiry Date

Signature

Name

Address

Postcode

Orders to:
Melbourne House
131 Trafalgar Road
Greenwich London SE10

Correspondence to:
Melbourne House
Tring
Hertfordshire

Trade enquiries welcome

SU11E

All Melbourne House cassette software is unconditionally guaranteed against malfunction.

Access orders can be telephoned through on our 24 hr ansafone (01) 858 7397.

CHILDREN'S EDUCATIONAL SOFTWARE

The MICRO MASTER Series for 7-13 years (any SPECTRUM)

RESEARCHED, DESIGNED AND TESTED by teachers with just one aim TEACHING. Easy to use — just RUN.

THE FOUR RULES OF NUMBER
(A package of 5 programmes)
This package promotes FAST and ACCURATE calculation ability at increasingly difficult levels. It is very EFFECTIVE as can be seen by consulting the enclosed grading tables for assessments of pupil's performance (given his age).

LANGUAGE DEVELOPMENT SERIES
(10 programmes on each cassette)
To develop VOCABULARY, SPELLING, CONCEPT ATTAINMENT, VERBAL REASONING and KNOWLEDGE OF THE ENGLISH LANGUAGE.

A complete series tailored to each age group. Used for remediation and, at the highest levels, for COMMON ENTRANCE etc.

THE FOUR RULES PACKAGE	£11.70
LANGUAGE DEVELOPMENT CASSETTE	£7.90
(State pupil's age.)	1 of each £14.50

Cheques to MICRO MASTER, Dept. SU, 94 Airedale Avenue, Chiswick, London W4 2NN. For further details phone Dr. K. W. Glasson 01-747 1373.

EXPERIENCED SINCLAIR/COMMODORE PROGRAMMERS REQUIRED IN WEST LONDON

BUSINESS USERS

SPECTRUM 48K
ACCOUNTS PREPARATION
Produces Prime Entry Listings, Nominal Ledger, Trial Balance, Profit and Loss Account and Balance Sheet with supporting schedules. 73 nominal ledger accounts and automatic VAT calculations.

Sole Trader/Partnership (Up to 4)	£25.00
Limited Company	£25.00
(Combined Price £35.00)	

SALES AND PURCHASE LEDGERS
Produces day book, sales/purchases and VAT analyses, debtors/creditors listings and statements. 250 accounts and 1000 monthly transactions. Automatically calculates VAT. £25.00

ZX-81 16K
ACCOUNTS PREPARATION
31 nominal ledger accounts

Sole Trader	£17.50
Limited Company	£17.50
(Combined Price £25.00)	

SALES AND PURCHASE LEDGERS
Produces day book, sales/purchase and VAT analyses, debtors/creditors listings, statements.
50 accounts and 200 monthly transactions.

Sales	£20.00
Purchases	£20.00
(Combined Price £25.00)	

All programs have been professionally developed and are being used by practising accountants and small businesses. Supplied on cassette with operating instructions.

Full details:

HESTACREST LIMITED
P.O. Box 19, Leighton Buzzard, Beds. LU7 0DG
Tel. 052-523 785.



- **Solves storage problems**
- **Computer angled for convenient use**
- **Avoids lengthy setting up**
- **Hides most of wiring**
- **Case and console moulded in black grained ABS plastic**

Treetop Designs, 61 Widmore Road, Bromley. Kent. BR1 3AA.

£44.95 (plus p & p)

Smart executive type case, purpose built, with locks, special hinges and lift-off lid.

Internal console allows neat installation of computer, power supply and printer in fitted recesses. Provision for housing tape recorders up to 28cm x 15cm.

Aluminium switch panel eliminates constant removal of plugs for both save/load and power off facilities and provides sockets for tape recorder leads, to allow operation in convenient position shown.

All internal wiring and leads supplied to allow easy plug-in installation.

Case lid fitted with shock absorbing foam to protect components when closed and with retaining straps for neat storage of mains and T.V. aerial leads.

To: Treetop Designs
Freepost, Bromley, Kent. BR1 3UZ

Please supply _____ cases at £47.45 each (incl. p&p and insurance)

My cheque/P.O. for £ _____ is made payable to Treetop Designs

PLEASE PRINT NAME AND ADDRESS

Mr/Mrs/Miss _____

Address _____

Please allow up to 28 days for delivery.

If you are not satisfied we shall of course refund your money, if you return the case undamaged within 14 days.

NO LIMIT



Now, a home computer with virtually no limit to its possibilities. The astonishing new Sharp MZ700. A machine with a dazzling array of talents.

First, it's a 'clean' machine. So you are not limited to any one computer language. You have the flexibility to run and write programs in BASIC, FORTRAN, MACHINE CODE, PASCAL, ASSEMBLER and many others. And the MZ700's 512 predefined characters mean you can build up detailed pictures on the screen, without spending time specifying and designing special characters for games and special effects.

Second, it has a memory of 64K. So as your technique improves and develops, you are able to move forward to more and more advanced programming.

All of which makes this the perfect home computer for parents, as well as children.

The MZ700 gives you access to a wide choice of new software, from only £3·95 per cassette. An additional plotter/printer, costing £129·95, can produce high resolution graphics in 4 colours. A data cassette recorder is an extra at £39·95. Both add-ons fit snugly into this easy to carry compact system with no trailing wires. And you get ten exciting games, free on purchase, including Super Puckman, Circus Star, Snake v. Snake, and Man-Hunt.

The brilliant new MZ700.
The no-limit computer. £249·95. From Sharp. Where great ideas come to life.



CPU:	Z80A	1
ROM:	Monitor 4K byte ROM	1
	Character generator 4K byte ROM	1
RAM:	64K byte D-RAM	8
	4K byte V-RAM	2
1/0 bus:	Expansion 1/0 bus	1
	Additional printer 1/0 bus	1
	Cassette READ/WRITE terminals	2
	Joystick terminals	2
RGB MONITOR/VIDEO MONITOR/RF OUTPUTS		

COMPATIBLE WITH SHARP MZ 700 SERIES

Look for this logo on software denoting Sharp Compatible Software.

To: Sharp Electronics (UK) Ltd,
Home Computer Division,
Sharp House, Thorp Road, Newton Heath,
Manchester M10 9BE. Tel: 061-205 2333

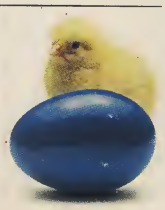
Please send me details of the Sharp MZ700.

Name _____

Address _____

_____ SU1

The world of
SHARP
where great ideas come to life.



SPECTRUM & ZX81 EDUCATIONAL SOFTWARE

SPECTRUM FAMILY LEARNING SERIES

Use our Computer Assisted Learning PACks to help your children with their school work. The programs in the series use moving colour graphics and sound to make learning more enjoyable. Each pack contains four programs and is suitable for use with the 16K or 48K Spectrum. Program notes are supplied.

CALPAC FL1 (5 to 8 years) **£9.50**
Tens and units addition and subtraction with detailed help facilities; powerful, easy to use drawing program; English comprehension applied to American Indians.

CALPAC FL2 (7 to 10 years) **£9.50**
Roman history; spelling tester with easy entry of your own lists; flexible table-tester; homophones.

CALPAC FL3 (9 to 12 years) **£9.50**
Nouns, verbs, adjectives and adverbs; tenses of verbs; biology of the flower; long division tutor.

The programs are ideal for the ages stated, but could be used by anyone requiring revision of these areas of study.

CALPAC C1 O-LEVEL CHEMISTRY £6.50

Four clearly presented revision/tutorial programs. The subject matter has been carefully structured to cover the most important aspects of:

- ★ Elements, compounds and mixtures.
- ★ Structure, bonding and properties.
- ★ Redox, electrolysis and the activity series.
- ★ Acids, bases and salts.

48K Spectrum and 16K ZX81 versions of the cassette are available. Please specify which you require.

Professional Computer Assisted Learning materials from:
CALPAC COMPUTER SOFTWARE
108 Hermitage Woods Crescent, St Johns, Woking, Surrey GU21 1UF.

machine code sort in your Spectrum BASIC

ALL-SORT

powerful fast brilliant

£9.95

Write for literature & stockists:
Alan Firminger
171 Herne Hill, London SE24

STACK LIGHT RIFLE



Available for the SPECTRUM, VIC-20, and the COMMODORE 64, comes complete with 12 feet of cable and three exciting action software games including "HIGH NOON SHOOTOUT" with full sound effects!



With the development of the SLR comes the exciting range of software, RATS & CATS, HIGH NOON SHOOTOUT, CROW SHOOT, ESCAPE FROM ALCATRAZ, GLORIOUS TWELFTH and BIG GAME SAFARI.

CONTACT YOUR LOCAL DEALER OR ORDER DIRECT FROM

All this for the incredible price of only

£29.95

including V.A.T.

STACK
Computer Services Limited
290/298 Derby Road, Bootle, Merseyside L20 8LN.
Tel: Sales **051-933 5511** Service **051-933 3355**
Telex: **627026** (Stack-G)

Upgrade your 16K ZX SPECTRUM Now!

The CHEETAH 32K RAMPACK simply plugs into the user port at the rear of your computer and increases the memory instantly to 48K.

- ★ Fully compatible with all accessories via rear edge connector
- ★ No need to open computer and invalidate guarantee
- ★ Why send your computer away and wait weeks for upgrade
- ★ Fully cased tested and guaranteed.

Why wait any longer?

Only £39.95 including VAT and P&P.



Now make your Spectrum and ZX-81 Talk

The Cheetah "SWEET TALKER" just plugs into the back of the computer using the existing power supply. Based on an allophone system you can easily program any word sentence or phrase. Fully cased, tested guaranteed and compatible with all accessories via rear edge connector. Complete with demonstration cassette and full instructions. No more lonely nights! Simply incredible at **£34.95** (Please quote when ordering whether Spectrum or ZX81 owner)

16K RAM Pack for ZX-81	**£19.75**
64K RAM Pack for ZX-81	**£44.75**

Prices include VAT, postage & packing. Delivery normally 14 days. Export orders at no extra cost. Dealer enquiries welcome.

Send cheque/PO now to:

CHEETAH MARKETING LTD
Dept SU/11
24 Ray Street
London EC1 R3 DJ
Tel: 01-278 6954

32K RAM Pack and "Sweettalker" also available from larger Branches of

John Menzies Boots WH SMITH

SPECTRUM RAM UPGRADE 16K→48K

A GREAT NEW DEAL!

£20.99

EASY TO FIT. CHIPS JUST PLUG IN.
NO SOLDERING. SENT WITHIN 10 DAYS

INCL. VAT, P. & P.

ISSUE TWO MACHINES ONLY (BLUE KEYS)

S.A.E. for details, please.

* * * * * * * * * * * *

DISPLAY INSTRUCTION SHEET

Get the best possible results from your Spectrum. Deals with yellowish white, wobbling colours etc. Send £1 plus Stamped Addressed Envelope

MAIL ORDERS ONLY. Cheques/P.Os to:
FOUNTAIN COMPUTERS LIMITED
Bishops Court,
Bishopstoke,
EASTLEIGH
Hants, SO5 6PE
(0703) 616505

SORRY, NO OVERSEAS ORDERS ACCEPTED (including BFPO, Channel Islands and Eire).

THE SPECTRUM ISN'T PRACTICAL - OR IS IT?

INTERFACE to data sources/collectors, remote sensors, printers...
MEASURE volts, temp, flow/freq. rates...
CONTROL light, heat, trains, alarms, robots, WW3!

- WITH -

byte-box 1 4 RELAYS c/o contacts 250*Vac* 8*A* (2*KW*): 1 ADC 0-5*V* up to 4 channels: 1 DAC 0-30*V* adj. o/p: 1 INPUT port: 1 OUTPUT port: 1 JOYSTICK port
£97.75 incl.

- OR -

byte-box 2 8 RELAYS rated as above: 2 ADC's 0-5*V* & 0-10*mV*/5*V* adj. gain up to 9 channels: 1 DAC as above: 2 INPUT - 2 OUTPUT - 2 JOYSTICK ports
£135.50 incl.

Ready to plug into Spectrum · Full guarantee

TO COME: «byte-bits» up-grade/expansion kits — sensors — ZX81 version — connectors...

☆ SAE for data ☆
Order now (or tell Santa!)...

Micha Design
UNIT 6, HALEACRE WORKSHOPS, GT. MISSENDEN, BUCKS. HP16 0DR

IMPACT SOFTWEAR

ZX Spectrum

MONSTER MINES
Whilst tunnelling underground you meet the killer moles. To stay alive you must shoot them with your bow and arrow which only has a limited range. There is a time limit on each screen and a quick time wins you bonus points. As you advance to deeper levels the moles become more and more fierce. Monthly prizes for highest score.
Keyboard/joystick (A.G.F. or Kempston)
ZX SPECTRUM 48K £5.75

SPECMAN
Excellent example of the popular arcade game in high speed machine code. Eat the dots and avoid the ghosts.
This one is really fast.
ZX SPECTRUM 16/48K £5.75

3-D MAZE
Exciting three dimentional maze game. Search for the three fabulous treasures, then make your way back to the exit. Time yourself with the on screen clock but take care the treasures are not always in the same place.
ZX SPECTRUM 48K £5.00

ZX TREK
Startrek game in real time, hi-res graphics, full colour and sound effects, constant on screen display of galaxy map, lange range scan, short range scan and status report. Over 20 commands.
ZX SPECTRUM 48K £6.50

ORB
Make your way through the under ground labyrinth in your search for the dreaded Orb, which you must destroy. Encounter many monsters, discover treasure and try to remember your route so that you can get out again. Save game facility.
ZX SPECTRUM 48K £5.00

GAMES PACK
1. Blitzkrieg - Destroy the city to land your bomber.
2. Jackpot - Fruit machine, with hold, nudge and gamble.
3. Laser Blast - Destroy the enemy bases. 100 skill levels.
4. Starship - 3 -D space battle.
5. Alien Rain - Destroy the invading aliens.

All in hi-res graphics
ZX SPECTRUM 16/48K £6.50

THE QUEST
Exciting adventure game, fight your way into the depths of the complex in your quest for the holy grail. Discover gold and precious stones, buy weapons and majic wares from a trader. Battle with one of the many monsters. Up to 1500 locations may be searched in the course of a game. Save game facility.
ZX SPECTRUM 48K DRAGON 32 £5.00



S.O.R. DEALER PACK

70 REDFORD AVE
EDINBURGH
EH13 OBW
031 441 4257

MACHINE TYPE _____

CASSETS REQUIRED _____

The dream sellers





CRL brings a whole new world of excitement right into your living room!

Games that test your skills to the ultimate – whether it's zapping down invaders or playing a whole game of cricket.

Only CRL offers such a wide choice of computer programs for the world's most popular micros.

... catch one today at Boots, Laskys, Menzies, selected branches of W. H. Smiths, Spectrum Group and all good computer shops or send direct to CRL.

Never has so much excitement been contained in a cassette!

CRL

140 Whitechapel Road London E1

Microdrives are still being developed

John Gilbert talks to Ian Logan, the man who wrote the software for the ROM in the new Sinclair storage device

DR IAN LOGAN leads a quiet life, despite having written several popular books about computers and having just completed work on the Microdrive ROM. There are few journalists pounding at his door and he prefers it that way. He has a country practice in and around Lincoln. He lives at Skellingthorpe on the outskirts of Lincoln, with his wife and children. Apart from the odd journey to the Cambridge offices of Sinclair Research or to London to take part in a Microfair, he handles most of his business by post or on the telephone.

Logan's Spectrums are in the bedroom. He has two of them set up with a dot-matrix printer. Surprisingly that collection occupies only a quarter of the room; the rest of it is not cluttered with the debris of an interest in computers.

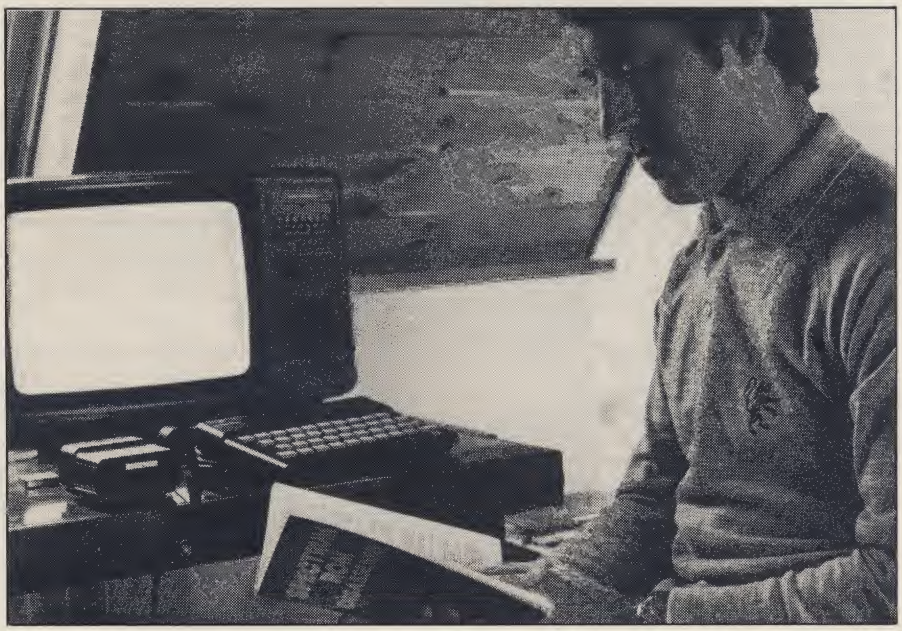
The two Spectrums are sufficient to run all the facilities of Interface One and Microdrives, of which he has two. He explains the development and use of the new Sinclair peripherals with the ease of a schoolteacher who has spent several years lecturing on a subject.

"I first started to work for Sinclair last December. I went to Cambridge and Nigel Searle asked me if I would like to do some work and I could write a book about it.

"At that time the Microdrive did not exist. It was developed in a large crate with the ULA at the centre. There is very little to the insides of the Microdrive. There is one ULA and the dual heads which read the tape. The Microdrive program was developed on EPROM. If there were corrections to the program I would go to Cambridge with the alterations and we would blow a new EPROM.

"In the end, Martin Brennan, who was in charge of the project, said 'Right, that's the end'. I have no doubt that he had added two extra things by the next morning."

Logan wrote the software for the Microdrive ROM only. It was Brennan who was responsible for the design for the network and he wrote most of the software which drove it as well.



In the early stages Brennan was known as the man who could get everything. He was the one who talked to those above and below. Logan says:

"His importance to the project was shown when you entered the office at Cambridge. One of the places which was off limits was the television laboratory. There were signs saying that it was a restricted area and no-one must enter. When you wanted to see Brennan there were no signs in his part of the office but you had to pass the paper shredder to reach him."

> 'At the moment there are still two definite bytes in the ROM of the device, which Logan hopes will be cleared quickly before the control program is put into the ROM'

The Microdrive controller program has not been put on to ROM, even though at least 1,000 have been sent to customers. Logan says:

"One reason the Microdrive still contains an EPROM is that Sinclair Research wants to re-design the circuit board at some stage. When you can get a Microdrive with a nicely-covered ULA and tidily-set-out board you will know that Sinclair is finally convinced that everything is right."

At the moment there are still two definite bugs in the ROM of the device, which Logan hopes will be cleared quickly before the Microdrive control program is put into ROM. One of the problems which occurs is that the Spectrum does not select the screen automatically when it returns from working with the Microdrive.

Logan thought of a simple answer to that during the interview. While he was demonstrating the network he found that by selecting the screen every time the computer discontinued work with the Microdrive, the problem would be eliminated.

Logan gives a very interesting description of how the interface devices

work. He says: "I like talking to people as, when you are explaining things, you develop new phrases and ways of putting things over."

He described the network as a fantastic piece of work, especially where the software for its operation is concerned. It will enable two Spectrums to be connected so that, for instance, two people on separate Spectrums can play the same game and influence each other's rate of play. He says:

"I think there is a great potential for two-player, interactive games. With the network you will be able to have two people playing a game. Each player will be influenced by the other's actions. You could imagine what it would be like to have something like The Hobbit using the network. You would not only have the computer continuing to perform actions even though the players are not doing anything — the players would also be able to affect what each other found in locations. I would be interested to see what a software house makes of the possibilities."

The RS-232 interface provided another interesting demonstration. Logan explained that it could be used to connect two Spectrums but it would also allow you to put any other piece of equipment on to the Spectrum. He says:

"The possibilities are endless. For instance, you could connect a BBC micro to a Spectrum using the interface. The Spectrum could then be told to wait for a signal and anything which you type on to the BBC keyboard could be printed on to a Sinclair printer attached to the Spectrum. Unfortunately you cannot tell one computer to inform another that you want to talk to it. You have to set the other computer to listen for any signals."

Logan's enthusiasm for the subject shows that he is still learning about the Interface and Microdrive. It seems that even though you help in the development of a device you can still discover new areas to look into weeks after you have finished the project. For instance, it is possible to speed the access time of the Microdrive to some extent if you have two parts to a program which are loaded separately. You may have a screen to load and then the main program. By writing a program to store the first screen, performing one or two CATs and finally saving the second part, the two programs will be loaded in a good position on the tape and will load back reasonably quickly.

If you do not do that the tape loop will go round one extra time and the two parts of the program will be in difficult positions when you need to find them again.

Many of those tips are in a yet-to-be-published book by Logan, *The Microdrive Book*. It delves into the workings of the Microdrive and how the Interface is used with it. Looking at the proofs there are plenty of illustrations of how programs and data are stored on tape and how to transmit data over the RS-232.

Also included is another aspect of the Interface which enables a user to patch, or add, extra Basic commands to the Basic interpreter. It means that you can write machine code extensions to the language and Logan has been busy doing so already.

> 'Logan is still learning about the Interface and Microdrive'

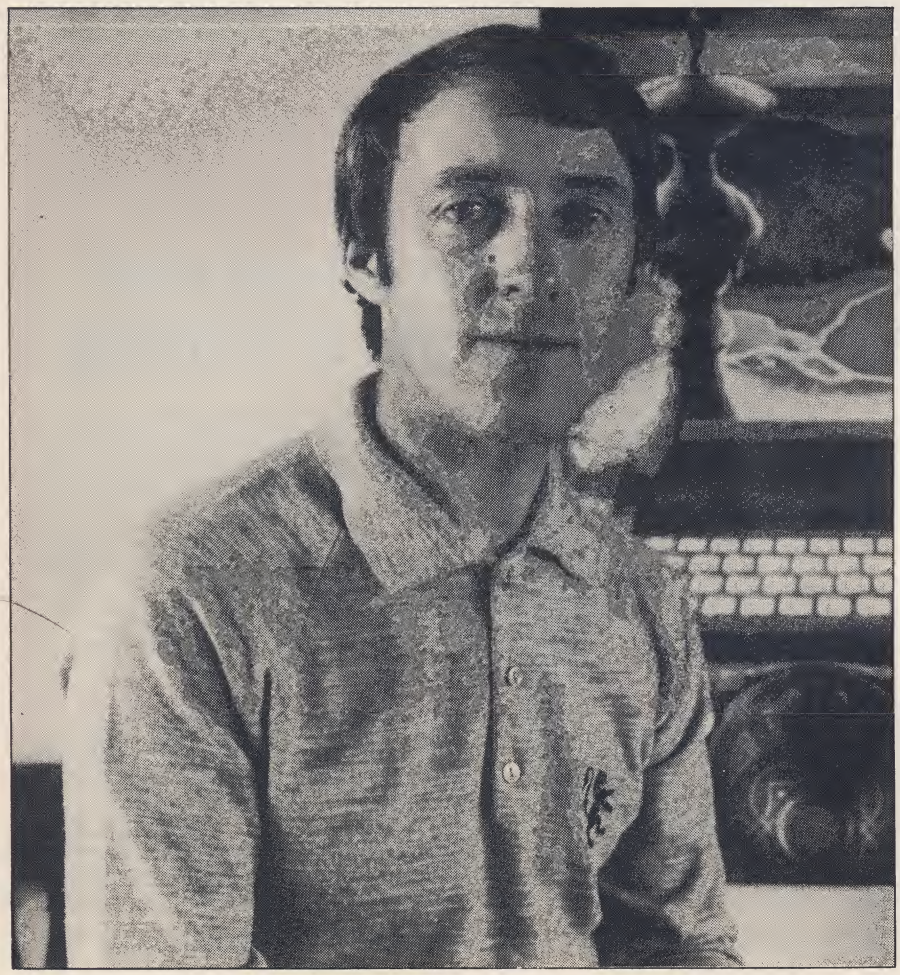
"You can re-define the original keywords to do different things but you cannot define your own keywords," he says.

Logan has created several new commands. One of them will allow the user to change the colours on the screen without using the CLS command to clear the screen and re-set the colours. Previously that meant clearing the screen, re-displaying anything which was on it and re-setting the new colours. With Logan's new command the machine does all that for you.

The book is due to be released soon and will be published by Melbourne House. It is likely to be the definitive and perhaps the only work on the Microdrive.

The Microdrive and all the work which he put into it may be behind Logan now. He says that Sinclair Research talks about it and the Spectrum in the past tense and that it arises only occasionally in conversation between the company's staff.

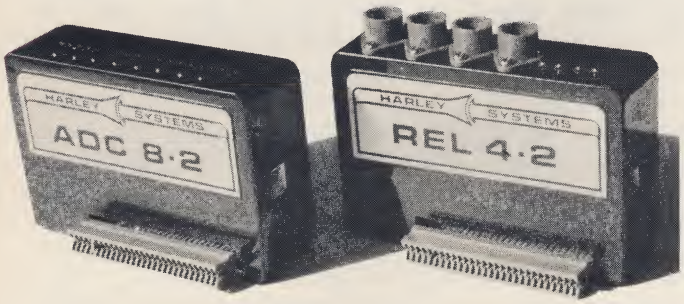
They have moved on to new and different projects, of which they talk only in whispers, but Logan is only just beginning to appreciate the potential of his Microdrive. Like the Spectrum ROM and all of the ZX-81 before it, he will be the one who tells the user what the Microdrive is capable of doing.



HARLEY SYSTEMS

ANALOGUE INPUT

RELAY SWITCHING



INTERFACES FOR SPECTRUM

Tough, durable cases for long life. No bare boards. Switched addressing for compatibility with all other peripherals. Daisy chain further modules or any other device. No mother board or cable required. Great economy. Compact.

ADC 8·2 £52
ANALOGUE INPUT MODULE

Monitor light, temp, strain etc. Capture data from instruments. Analyse and record signals. 8 channels. 8 indicating LEDs. Simple term' block connections. Inputs from 0 to +10 mV up to 0 to +5.12V. Sensitivity chosen by resistors. Up to 40,000 rdgs per sec. Use Basic or MC code.

REL 4·2 £58
RELAY SWITCHING MODULE

Switch Lights, motors, heaters chillers, solenoids, Hi Fi etc. Control machines, processes, light shows, instruments etc. High power handling. 4 channels each with warning LED. Up to 12 switchings/sec. Switch up to 5A @ up to 240 VAC. Safe insulated sockets.

Postage £1·00. All prices include VAT @ 15.
Cheques/PO's payable to

Send SAE for more details.

HARLEY SYSTEMS LTD,
BOX 3, THE PEPPERBOXES,
GT. MISSENDEN,
BUCKS,
HP16 9PR.



New action sports games feature a 3D view of the game. In football and tennis you play one side, the computer plays the other. The computer is fast and hard to beat. Different skill levels.

FOOTBALL
Each player can move, shoot etc. independently. Includes fouls if players collide, corners, throw-ins etc. Scale 90 minutes play. Any team of names can be used. Game can be suspended and player numbers shown at the press of a key. **Price £5.50.**

BIG MATCH SOCCER
Just like football game but for 2 players. Each player uses keys at his side of the keyboard to control his men. All men can be moved, shoot etc. independently. Practice with football then play your friends in the big match. **Price £5.50.**

SUPER SOCCER
A deluxe version of the football. Even faster action, harder to beat. Choose team colours etc. **Price £7.00.**

TENNIS
Each key plays a different stroke. Move your players anywhere on court. Computer plays a hard game. All tennis rules used, just like the real thing. Proper serving and scoring. Plays 3 sets. Animated figures. **PRICE £5.50.**

TANK BATTLE
3D view from the tanks' turret of woods, villages, attacking tanks etc. Shots can destroy buildings, trees and enemy tanks. 360 degree turret movement. **Price £4.50.**

CAR RACE
You drive one car, the computer the other. Control your car with steering and brakes. Choice of 2 circuits. Lap counters and time recorded. **Price £3.95.**

Buy any 3 games, get any game free
Please add 35p post and packing per order

Winters Ltd, Dept SU, 24 Swannington Close, Cantley, Doncaster, S Yorkshire, DN4 6UA

NEW! For ZX Spectrum 48K

MAKES FUN OUT OF LEARNING

COMPUTER TUTOR

Computertutor can give your child a head start with games that really make fun out of learning

Children of today are fascinated by computers. With micros already used in schools throughout the country their involvement in education and in our daily lives is increasing all the time.

To give young children a head start we've created, with parents, teachers and, of course, children, the Clever Clogs series, designed to appeal to children in the 3-7+ year old age group. Help them develop basic skills, stimulate imagination and increase their self-confidence. Unlike similar products, each Clever Clogs program offers a wider choice of games to play. And each game can be made more 'difficult' by simple editing of the tape and resetting new questions. In this way you can keep up with your child's progress - even link the questions into work they're doing at school.

The Clever Clogs series can be used by your whizzkid on their own with initial help from you.

Price of each program £6.50
(incl Vat, P & P). Overseas orders
£1 extra per tape for airmail delivery.



SPECIAL LAUNCH OFFER Buy 3 games – get one C20 blank tape FREE!

PARTY TIME for Age 3 yrs +
With parent's help even tiny tots will love to play these party games. They can 'blow out' the candles on a cake, sing along with nursery rhymes, even draw on the screen. If you have a printer you can record your Clever Clogs artistic efforts and watch their progress as they develop new skills. Because each Clever Clogs program offers a choice of games to play and has the facility to increase the 'difficulty' factor your children won't grow out of them so quickly.

JUNGLE JUMBLE for Age 5 yrs +
At this age less parental help and guidance are necessary. Your child will continually be seeking new experiences and will enjoy his/her mind being challenged. Clever Clogs satisfies both criteria.

Correct answers to questions build up a picture of an animal - is it a real one? That's up to the player. Take your choice and create your own unique zoo and you can record them on your printer if you have one. By getting correct answers to several questions you can enter the great Safari Park chase . . . the possibilities are endless!

***WHIZZ QUIZ for Age 7 yrs +**
A game of skill and chance for 1-4 players that will get your whizzkids thinking hard. But Clever Clogs of this age like a challenge. You can proceed from the general knowledge questions already programmed and you can enter up to 250 questions of your own - there's tremendous scope here for the really clever, Clever Clogs! Watch them develop their three "R's" and in a way that will fascinate you as much as them.

*Also for ZX Spectrum 81 (16K)

Trade enquiries invited.

Please send me:
_____ copies of PARTY TIME (3 yrs +) at £6.50 per tape
_____ copies of JUNGLE JUMBLE (5 yrs +) at £6.50 per tape
_____ copies of *WHIZZ QUIZ (7 yrs +) at £6.50 per tape
_____ *Also for ZX Spectrum 81 (16K)

I enclose cheque/PO for £

Name_____

Address_____

_____ **Postcode**_____

Computertutor, P.O. Box 3, St. Neots, Huntingdon, Cambs. PE19 3NW Telephone: (0480) 213969

SU 10/83

Please allow 7 days for delivery

cp software

Spectrum software

BRIDGE PLAYER

At last you can play Bridge against your Spectrum. Unlike other bridge type programs, Bridge Player does not use pre-dealt hands.
The Acol bidding system with a week 1NT opening bid is used and the Blackwood and Stayman conventions are accepted. The display shows your hand and dummy, which you also play, the current and last trick, score and contract. A replay facility and scoring with honours, slam and rubber points are included.
Makes an ideal combination with our Bridge Tutor.

48K Spectrum £8.95

COLOSSAL CAVES

Enter the Colossal Cave, discover the treasure left by the wizard. On your travels you will meet dragons, snakes, trolls and other denizons of the underworld. Be warned, this adventure can be addictive. Includes a save facility so that the adventure can be continued from the point reached when saved. This is based on the original adventure game by Crowther with 140 locations and a vocabulary of more than 200 words.

48K Spectrum £6.95

GOLFING WORLD

Choose a club and the direction, use your skill to miss the bunkers, trees and water, reduce your handicap and watch your game improve.
Handicap Golf, a 1 or 2 player game played on a randomly generated course wth a 'close up' of the greens for putting. Reduce your handicap below 12 and enter the Club Championship; win this to qualify for the Open. The Club Championship and the Open are one player games played on a set course modelled on Lytham St. Annes. Scoring card, hole details and leader board (Championship and Open) shown.

48K Spectrum £5.95

SUPERCODE

The ultimate Machine Code Tool Kit with 100 routines. Renumbers with and without go to's, go sub's etc; on break/on error go to; beep/sound generator; block inserts/deletes; REMKill; dozens of screen routines' random number generator; etc.
★ Index of routines ★ Call up details of each routine including information to tailor the routine to individual requirements ★ Repeatable demonstration of most routines, save and verify individual routines ★ Direct from the combined (48K only) Basic program, 16K version using printed instructions.

16K and 48K Spectrum £9.95

FLOATING POINT FORTH
WITH EDITOR

Supports Forth 79 structures, trig functions, logs, RND, square roots, etc., the ZX printer and access to I/O ports.
Has all the Spectrum hi-res colour graphics, plot and draw and beeper facilities. Allows direct entry of machine code. Up to 300 stock items, 117 UDG characters and 23 named variables are available Comprehensive User Guide supplied.

48K Spectrum £13.95

ZX REVERSI

When put to the test against other Spectrum Reversi programs, ZX Reversi was the conclusive winner. 10 levels of play (easy to expert).
Self play, player v. player and player v. computer, handicap system, set up a position, select the colour of the display, scrolling move history, scoring updated after each move.

48K Spectrum £6.95

SUPERCHESS II

One of the strongest Spectrum chess programs, beating Sargon II, whose features include:
· 7 level of play
· Plays a variety of openings
e.g. French Defense, Sicilian Defense, Ruy Lopez, Queen's Gambit etc. · Self play mode · Analyse mode · Enhanced end-game play · Recommended move option.

SUPERCHESS II

16K Jupiter Ace	£8.95
Lynx	£8.95

48K Spectrum £7.95

SNAIL LOGO

An advanced implementation to the Logo turtle type graphics. Uses the original style Logo instructions to control the movements of a graphical Snail around the screen instead of a mechanical turtle. Includes the following features: · Full operating system and Editor · Comprehensive user guide with sample programs · Multi-level Hierarchic Procedures · Procedures with Parameters · Recursive Procedures · Nestable repeat loops · Variables · Colour and wall bouncing controls · 25 Language Instructions, over 20 warning and error messages · Commands to control the optional ZEAKER turtle.

48K Spectrum £9.95

PLUS

ORIGINAL SUPERCHESS	
16K ZX81/48K Spectrum	£4.95
16K SUPERCHESS	
16K and 48K Spectrum	£6.95
ZX DRAUGHTS	
48K Spectrum	£5.95
Lynx/16K Jupiter Ace	£6.95
BACKGAMMON	
48K Spectrum	£5.95
SOLTALK I Multiwords	
48K Spectrum	£5.95
SOFTALK II Spacegames	
48K Spectrum	£5.95
BRIDGE TUTOR	
Beginners or Advanced	
16K and 48K Spectrum	£5.95
SPECTRUM FORTH Integer	
16K and 48K Spectrum	£9.95

Also available at Boots, WH Smith and all good computer shops.

Access

Send SAE for catalogue.

DELIVERY

UK prices include VAT and post & packing
EUROPE add 80p per program. **ALL OTHER PLACES** for air mail add £2 for the first program and 50p for each subsequent program. Surface delivery add 80p per program.

Send cheque, postal order or Access no. to:

CP SOFTWARE, Dept.SU9,17 Orchard Lane, Prestwood, Bucks. HP16 0NN

At last...
A joystick that works!

The **intelligent** Joystick

Cambridge Computing bring you the first **programmable** joystick ~ at a price you can afford.

£29.90
JOYSTICK, INTERFACE AND TAPE COMPLETE



Interface

- 1k on board memory
- Own rear edge connector — for printers etc.,
- Compatible with all standard joysticks



Joystick

- Self centring
- 8 Directional microswitched action
- 2 independent fire buttons



Tape

- Easy to use program enables the interface to work on ALL software
- Keeps a record of all your games — so you only need to tell it about each game once!

CAMBRIDGE COMPUTING

40-42 Hobson Street Cambridge CB1 1NL
Telephone 0223 322905
Available Mail Order and from Dealers

Please send me:—
Joystick, Interface and Tape at £29.90. ☐
Interface and Tape at £24.00. ☐
Joystick only at £7.00. ☐
For Spectrum SU
I enclose cheque/postal order for £..... made payable to Cambridge Computing Limited.

Name.
Address.
.

MEMOTECH

The Complete Range

NEW PRICES UP TO 37.5% OFF PLUS FREE P+P

Fifteen months ago Memotech developed the first 64K Memopak, designed to maximise the capabilities of the Sinclair ZX81. Since then, using the ZX81 as a starting point, we've gone on to produce a comprehensive range of Memopaks, adding 16K and 32K memory expansions, utilities packages comprising a Word Processor, Z80 Assembler and Spreadsheet Analysis, plus Communication Interfaces, High Resolution Graphics and a professional quality Keyboard.

To complete our range of ZX81 add-ons, we are now introducing the MEMOPAK RS232 Serial Interface.

RS232 Interface

The RS232 is an all-purpose interface which allows the ZX81 not only to output to suitable serial printers, but can link up with numerous types of peripheral or even other processors. The Interface has two main modes of operation: BASIC mode allows you to use the range of functions supplied in the RS232 EPROM within an ordinary BASIC program, and TERMINAL mode allows you to use your ZX81 as a terminal to another processor. The EPROM functions offered permit the user to send, receive and convert bytes between ZX81 code and ASCII, as well as check the status of numerous control flags. Received or transmitted data can appear simultaneously on the screen, and received data may be printed simultaneously.

£39.95 inc. VAT

Memopak Centronics I/F

The BASIC commands LPRINT, LLIST and COPY are used to print or any CENTRONICS type printer. All ASCII characters are generated and translation takes place automatically within the pack. Reverse capitals give lower case. Additional facilities allow high resolution printing.

£24.95 inc. VAT

Memopak HRG

This pack breaks down the constraints imposed by operating at the ZX81 character level and allows high definition displays to be generated. All 248 × 192 individual pixels can be controlled using simple commands, and the built in software enables the user to work interactively at the dot, line, character, block and page levels.

£29.95 inc. VAT

Memocalc

The screen display behaves as a 'window' on a large sheet of paper on which a table of numbers is laid out. The maximum size of the table is determined by the memory capacity, and with a Memopak 64K a table of up to 7000 numbers with up to 250 rows or 99 columns can be specified.

£29.90 inc. VAT

Memotext

Text is first arranged in 32 character lines for the screen with comprehensive editing facilities. On output the user simply chooses the line length required for printing and the system does the rest. Used with the Memopak Centronics Interface, the Word Processor makes available printout with 80 character lines, upper and lower case and single and double size characters.

£29.90 inc. VAT

Memopak Memory Extensions

For those just setting out on the road to real computing, these packs transform the ZX81 from a toy to a powerful computer. Data storage, extended programming and complex displays all become feasible. Further details available on request.

16K Memopak £24.95 32K Memopak £34.95
64K Memopak £49.95 Prices inclusive of VAT

MEMOPAKS ARE AVAILABLE AT MAIN BRANCHES OF WH SMITH and JOHN MENZIES



Z80 Assembler

The Assembler allows you first to code and edit a source program in the Z80 language, and then assemble it into machine code. You can now write flexible and economic programs. The Editor mode allows you to code directly in the right format, manipulate individual lines and control the exact placing of source and machine code. Routines may be merged or listed (even to a commercial printer using our Centronics Interface). The assembler mode handles all standard Z80 mnemonics, numbers in hex or decimal, comments and user-selected labels.

£29.90 inc. VAT

Memotech Keyboard

The Memotech plug-in Keyboard plus buffer pack takes the effort out of data entry for ZX81 users. The Keyboard has a light professional touch and is housed in an elegant aluminium case. The simple plug-in system means that you are not obliged to open up your ZX81, use a soldering iron or invalidate your ZX81 warranty.

Keyboard Buffer Pak

The Buffer Pak performs a "housekeeping" function for the Keyboard, interfacing directly with the port of your ZX81.

£34.95 inc. VAT



All Prices are inclusive of VAT, postage and packing.

To Order: Send your Name, Address, Memopaks required, plus a Cheque/Postal Order/Access/Barclaycard number (please state which) to: Memotech Limited, Station Lane Industrial Estate, Witney, Oxon. OX8 6BX. Telephone Witney 2977

We want you to be completely satisfied with your Memopak – all our products carry a 14 day money back guarantee.

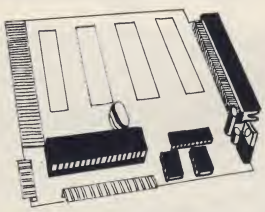
FB tronics
SPECSPANSION

A combined 4-slot motherboard and 24-line bi-directional programmable portboard, supplied with a comprehensive User Manual.

A software programming aid, on cassette, is also available.

Plugs directly into the Spectrum, no extra connectors required. ZX printer and other periphrals can be plugged onto the board's edge connector.

Port connections via edge pins, either solder direct or, we recommend, use sockets which can be supplied.



On Board +5 volts regulator.
Built in address decoding available at three of the motherboard slots for up to a further 12 ports. Manual gives details of addressing.
Provision for 4 additional cards, either your own or, coming soon, RS232/centronics interface, A to D converter, relay box interface, Joysticks.

Upgrade in stages, the board can be supplied drilled only to take the additional connectors later on with one or more of the connectors fitted as required.

Prices:	
Port/motherboard drilled only	**£18.50**
Port/motherboard fitted with additional connectors (up to 4), per connector, add	**£3.50**
Motherboard connectors loose, per connector	**£3.00**
Port sockets, per set of 6	**£1.40**
Programming Aid cassette	**£3.50**

For boards, add 80p postage and packing; for other items, add 40p.
Orders dispatched within 48 hours.

Dept SU
F B Tronics, Unit 2, Park Brook Industrial Estate, Park Street, Lye, Stourbridge, West Midlands, DY9 8SS



STAR SOCCER



The ACTION game with the thrills of real football
Choose your team formations from 3-2-5, 4-2-4, or -4-4-2.
When the game starts it's up to you to plan your moves and outwit your opponents. See the results played out by fast machine code routines on a birds-eye view of the pitch.

Make the split second decisions that the professionals have to!
Shall I make the short safe pass and maybe let the defence re-group?
Or do I try a long defence-splitting ball and risk an interception?
Has my winger got the speed to take on the full back and beat him?
Do I try a long shot and catch the goalie off his line?
Or shall I give the ball to a team-mate in a better position?

The more games of "Star Soccer" that you play, the more skillful you will become. You'll learn how to set up the goal-scoring opportunities, and how to get yourself out of tight corners. You'll develop your own style of play and find out which formation suits you best.

Side 1 features a SUPER LEAGUE competition between 8 top British sides. Aberdeen, Aston Villa, Celtic, Liverpool, Manchester United, Rangers, Spurs and West Ham. 28 games in all and the League Table is automatically maintained for you.

Side 2 replays the WORLD CUP finals. It's a knock-out competition between England, Scotland, N. Ireland, Italy, West Germany, France, Brazil and Argentina. Lots of excitement with sudden-death extra time in drawn games.

It's amazing how so much is packed into 16K!

Available for ZX Spectrum and ZX81
(Please state which machine when ordering) **ONLY £5.95**

Watson Software Services Ltd. (Dept. B1)
1, Ivy Cottages, Long Road West, Dedham, Essex CO7 6EL

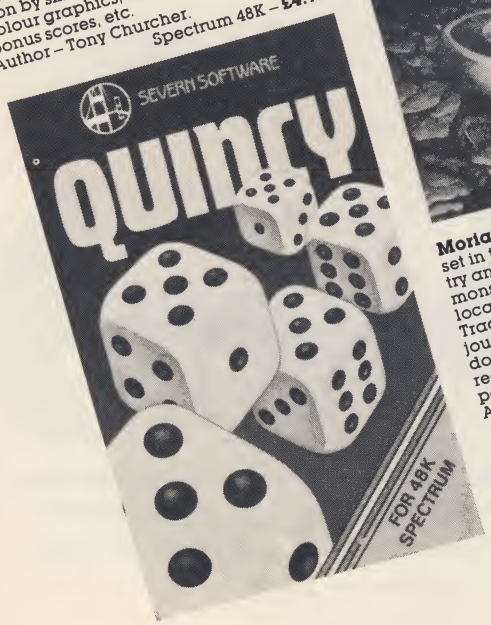
Trade enquiries welcome.



The REAL Challenge!

For Spectrum

Quincy A superb dice game for 2 to 6 players. 3 throws per go to try and score points by obtaining certain combinations, i.e. 3 of a kind, a run, pairs etc. 13 go's to complete a game. The highest score is the winner! It's a game that is easy to learn but can be won by skilful and thoughtful play. Full colour graphics, on-screen instructions, bonus scores, etc.
Author – Tony Churcher. Spectrum 48K – **£4.95.**





Moria A challenging adventure game set in the mines of Moria. You'll have to try and survive encounters with the monsters of middle-earth while trying to locate Durins Ring. The Wizard and the Trader may help or hinder you on your journey to find and open the hidden doors to freedom – a game that will really test your character and staying power.
Author – Mike Howard. Spectrum 16/48K – **£4.95.**



Jogger Guide your joggers across a 4-lane motorway and crocodile infested river to reach their safe haven through the gap in the fence. Each time a jogger is safely home the next one will have to encounter more lorries and cars on the motorway but fewer crocodiles and logs in the river. Full on-screen instructions. M/code, sound effects and full action colour graphics.
Author – Mike Howard. Spectrum 16/48K – **£4.95.**

Available from good computer shops or direct.

TRADE ENQUIRIES WELCOME.

SEVERN SOFTWARE

Severn Software, 5 School Crescent, Lydney, Gloucester, GL15 5TA

Please send me (Tick Box)
☐ Quincy @ £4.95 ☐ Moria @ £4.95 ☐ Jogger @ £4.95

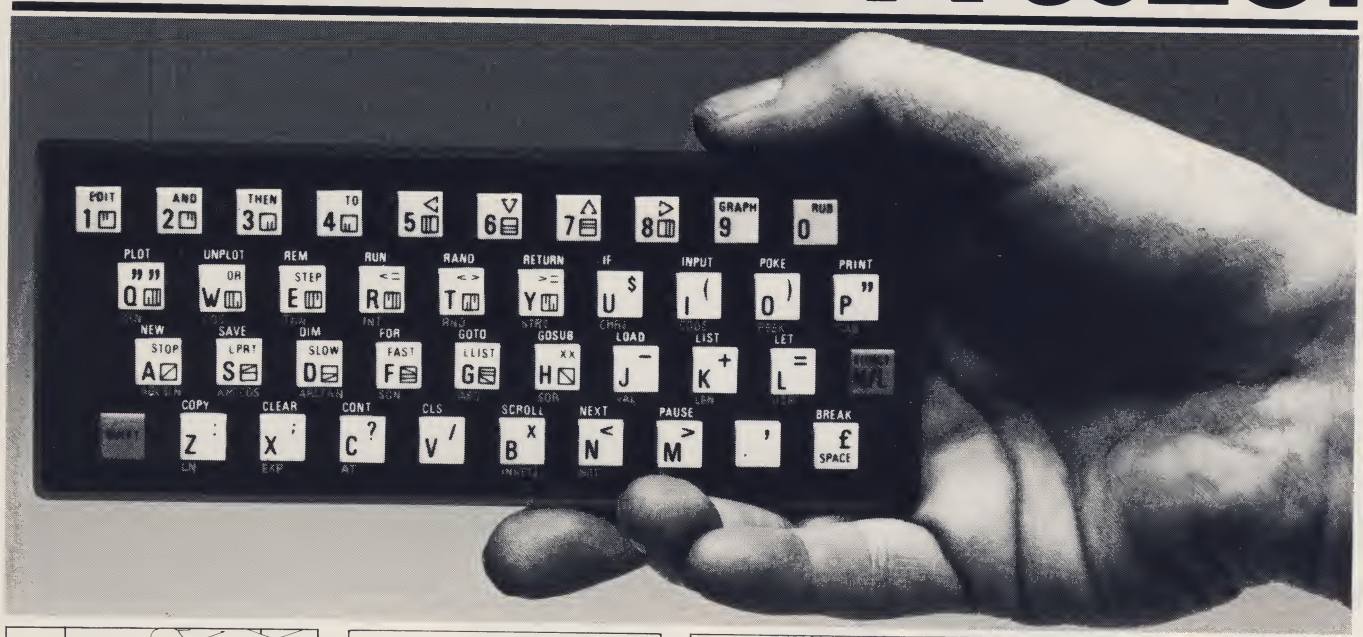
Name _____

Address _____

SU11

I enclose Cheque/P.O. for £_____
made payable to Severn Software
All prices include VAT & P & P.
Overseas P & P add 50p.

NOW. A ZX81 PUSH-BUTTON KEYBOARD FOR UNDER £10.

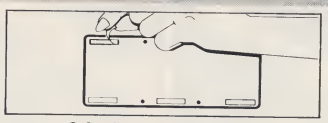




1. Make sure the original keyboard is clean and check that all the keys function.



2. The Buttonset is held in place by self-adhesive pads.



3. So all you do is remove the protective backing.



4. And place it centrally on your ZX81.

At last there's a really cheap but efficient way of ironing out the ZX81's only real bug: its keyboard. The Filesixty Buttonset offers:

■ A full-travel calculator-type moving keyboard for only £9.95. ■ Installed in seconds. The peel-off adhesive backing means you just register into position and press. ■ No messy labels, dismantling or soldering. ■ 3 groups of colour keys to pick out shift, numerals and newline. ■ Precision moulded in ABS to match your ZX81, with contrasting legends for maximum legibility.

Filesixty Ltd., 25 Chippenham Mews, London W9 2AN, England.
Tel: 01-289 3059. Telex: 268 048 EXTLDN G 4087.

Orders to Filesixty Ltd., FREEPOST, London W9 2BR.

Cheques/PO made payable to Filesixty Ltd.

Please send me_____ (qty) Buttonset(s) at £9.95 each (including VAT and P&P).

Total £

BLOCK CAPITALS

Name

Address

SU11/83

FILESIXTY

explore the mysterious world of Artic Adventures

Artic Computing Ltd

NEW



E The Golden Apple

8K Spectrum
You must set out on a quest to find the Golden Apple'. On your journey you will pass through mansions, travel overseas and onto an island, hunting your treasure.

ZX Spectrum Adventures £6.95
ZX 81 Adventures £5.95

All these games are instant-response machine code programs. Adventures B, C and D include cassette save routines.

Artic Computing Ltd.
Main Street, Brandesburton,
Driffield YO25 8RG.
10% Discount for 2 and 15% for 3 or more.
Cheques and P.O.'s made payable to Artic Computing Ltd.
Dealer enquiries welcome.
Please state whether your order is for ZX81 or SPECTRUM.
Access and Barclaycard welcome.

Send S.A.E. (9 in × 6 in) for FREE catalogue of our wide range of programs

A



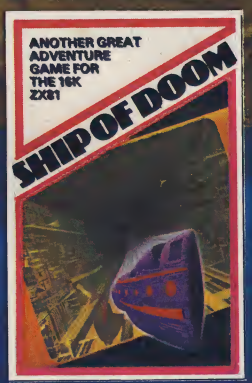
16/48K ZX/Spectrum
16K ZX81
You find yourself stranded on a strange alien planet. Your aim is to escape by finding your captured space craft. But beware of the little green man who may get to you!

B



48K Spectrum
16K ZX81
You are in the middle of a South American jungle when you stumble across a strange Inca temple. Enter it to collect treasure and then try to return. But beware don't let greed be your downfall.

C



48K Spectrum
16K ZX81
While on a reconnaisance mission you are drawn to an alien cruiser on a humanoid slave mission. Try to escape from aggressive aliens, luscious androids and drunken barmen. Your only help is Fred the friendly android.

D



48K Spectrum
16K ZX81
You have to survive an engine failure while flying over an apparently uninhabitated island in the South Atlantic. Use your wits to harass the enemy, but treat the beautiful native women with respect, to escape from the island and return to an allies aircraft carrier.

VISA ACCESS

ARTIC COMPUTING LTD.
Main Street, Brandesburton,
Driffield YO25 8RG.

ARTIC

Please rush me:
*Adventure A☐ B☐ C☐ D☐ E☐
*for my ZX81 £5.95 /SPECTRUM £6.95

I enclose a cheque for £ _____
or debit my Barclaycard/Access account

☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

NAME _____

ADDRESS _____

SU11

*Tick, delete or complete as applicable.

WARNING: These programs are sold according to ARTIC COMPUTING LTD's terms of trade and conditions of sale. Copies of which are availabe on request.

PROGRAM PRINTOUT

Instructions for graphics characters are printed in lower-case letters in our listings. They are enclosed by brackets and separated by colons to distinguish them and the brackets and colons should not be entered.

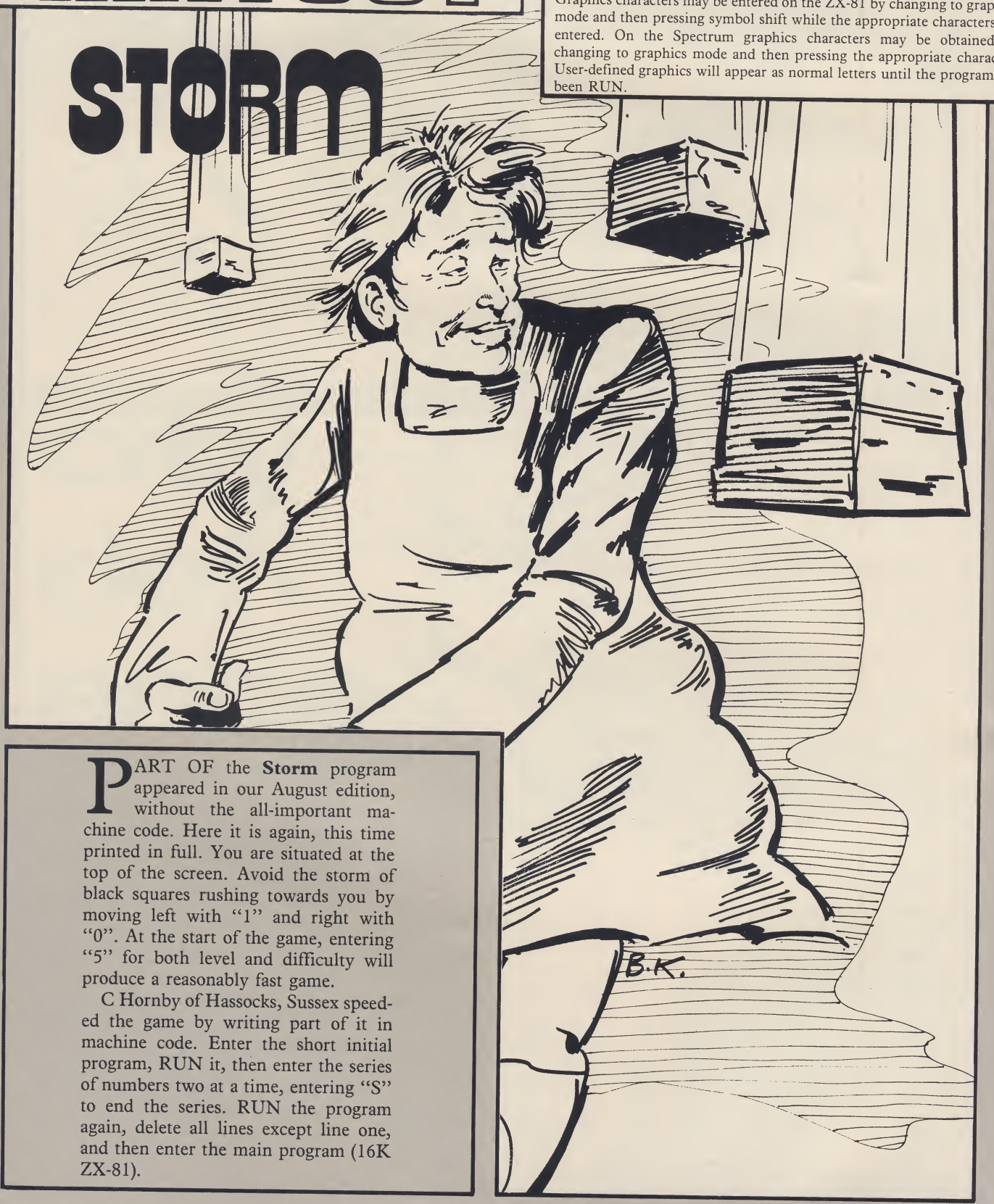
Inverse characters are represented by the letter "i" and graphics characters by "g". Thus an inverse W would be represented by "iw", a graphics W by "gw", and an inverse graphics W by "igw".

Spaces are represented by "sp" and inverse spaces by "isp". Whenever any character is to be used more than once, the number of times it is to be used is shown before it, together with a multiplication sign. Thus "6*isp" means six inverse spaces and "(g4:4*i4:g3) would be entered as a grapic four, followed by an inverse four repeated four times, followed by a graphics three.

Where whole words are to be written in inverse letters they appear in the listings as lower-case letters. Letters to be entered in graphics mode on the Spectrum are underlined.

Inverse characters may be entered on the ZX-81 by changing to graphics mode and then typing the appropriate characters and on the Spectrum by changing to inverse video and typing the appropriate letters. Graphics characters may be entered on the ZX-81 by changing to graphics mode and then pressing symbol shift while the appropriate characters are entered. On the Spectrum graphics characters may be obtained by changing to graphics mode and then pressing the appropriate character. User-defined graphics will appear as normal letters until the program has been RUN.

STORM



PART OF the **Storm** program appeared in our August edition, without the all-important machine code. Here it is again, this time printed in full. You are situated at the top of the screen. Avoid the storm of black squares rushing towards you by moving left with "1" and right with "0". At the start of the game, entering "5" for both level and difficulty will produce a reasonably fast game.

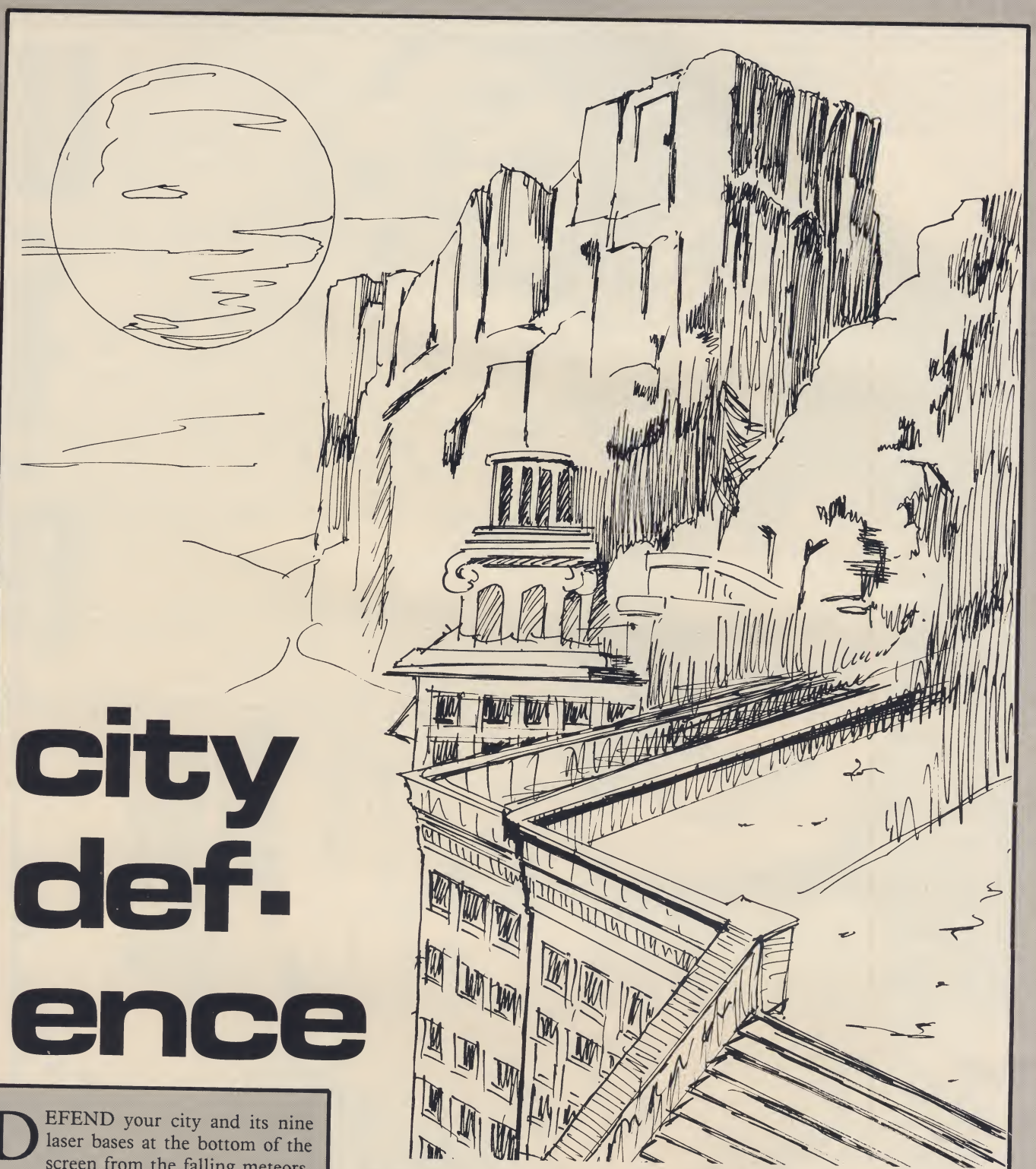
C Hornby of Hassocks, Sussex speeded the game by writing part of it in machine code. Enter the short initial program, RUN it, then enter the series of numbers two at a time, entering "S" to end the series. RUN the program again, delete all lines except line one, and then enter the main program (16K ZX-81).

```
   1 REM 000000000000000000000000000
0000000000000000000000000000000000000
0000000000000000000000000000000000000
0000000000(THIS IS ONE HUNDRED A
ND EIGHTY EIGHT CHARACTERS IN AL
L)0000000000000000000000000000000000
00000
  10 LET A$=""
  20 FOR X=16520 TO 16701
  30 IF A$="" THEN INPUT A$
  40 POKE X,16*CODE A$+CODE A$(2
)-476
  50 SCROLL
  60 PRINT X;"   ";A$( TO 2)
  70 LET A$=A$(3 TO )
  80 NEXT X
```

2A	ØC	4Ø	23	Ø6	Ø8	36	1C	23
Ø5	2Ø	FA	23	Ø6	Ø3	36	3B,	23
Ø5	2Ø	FA	2A	ØC	4Ø	11	23	ØØ
19	22	82	4Ø	3E	Ø4	32	84	4Ø
3A	84	4Ø	3D	2Ø	Ø1	C9	32	84
4Ø	2A	ØC	4Ø	11	Ø9	ØØ	19	5F
19	36	ØØ	2A	ØC	4Ø	11	Ø8	ØØ
19	34	Ø6	Ø8	7E	FE	26	2Ø	Ø5
36	1C	2B	34	23	2B	Ø5	2Ø	F2
2A	82	4Ø	36	ØØ	3A	25	4Ø	CB
5F	2Ø	Ø1	2A	CB	67	2Ø	Ø1	23
3E	76	BE	28	Ø3	22	82	4Ø	2A
ØC	4Ø	11	21	ØØ	19	E5	19	D1
Ø1	D6	Ø2	ED	BØ	2A	82	4Ø	3E
8Ø	BE	CA	AC	4Ø	36	3B	Ø6	Ø1
2A	ØC	4Ø	11	D6	Ø2	19	ED	5B
34	4Ø	CB	BA	CB	B2	CB	AA	1A
CB	BF	CB	B7	CB	AF	3C	16	ØØ
5F	19	36	8Ø	Ø5	2Ø	DE	3E	Ø4
Ø6	ØØ	Ø5	2Ø	FD	3D	2Ø	F8	C3
C1	4Ø							




```
  10 PRINT AT 0,0;"000000000 VVV
storm"
  20 POKE 16418,0
  30 FOR N=1 TO 23
  40 PRINT "
                "
  50 NEXT N
  60 POKE 16418,2
  70 PRINT AT 10,3;"ENTER LEVEL
OF DIFFICULTY"
  80 INPUT A
  90 IF A>255 THEN GOTO 80
 100 POKE 16654,A
 105 PRINT AT 10,3;"       ENTER
SPEED          "
 110 INPUT A
 120 IF A>255 THEN GOTO 110
 130 POKE 16690,A
 135 PRINT AT 10,3;"
                "
 136 FOR N=1 TO 50
 137 IF INKEY$<>"" THEN GOTO 140
 138 NEXT N
 140 RAND USR 16520
 150 PRINT AT 10,10;"GAME OVER";
AT 20,9;"PRESS A KEY"
 160 IF INKEY$<>"" THEN GOTO 160
 170 IF INKEY$="" THEN GOTO 170
 180 RUN
 190 SAVE "STORM"
 200 RUN
```



city def-ence

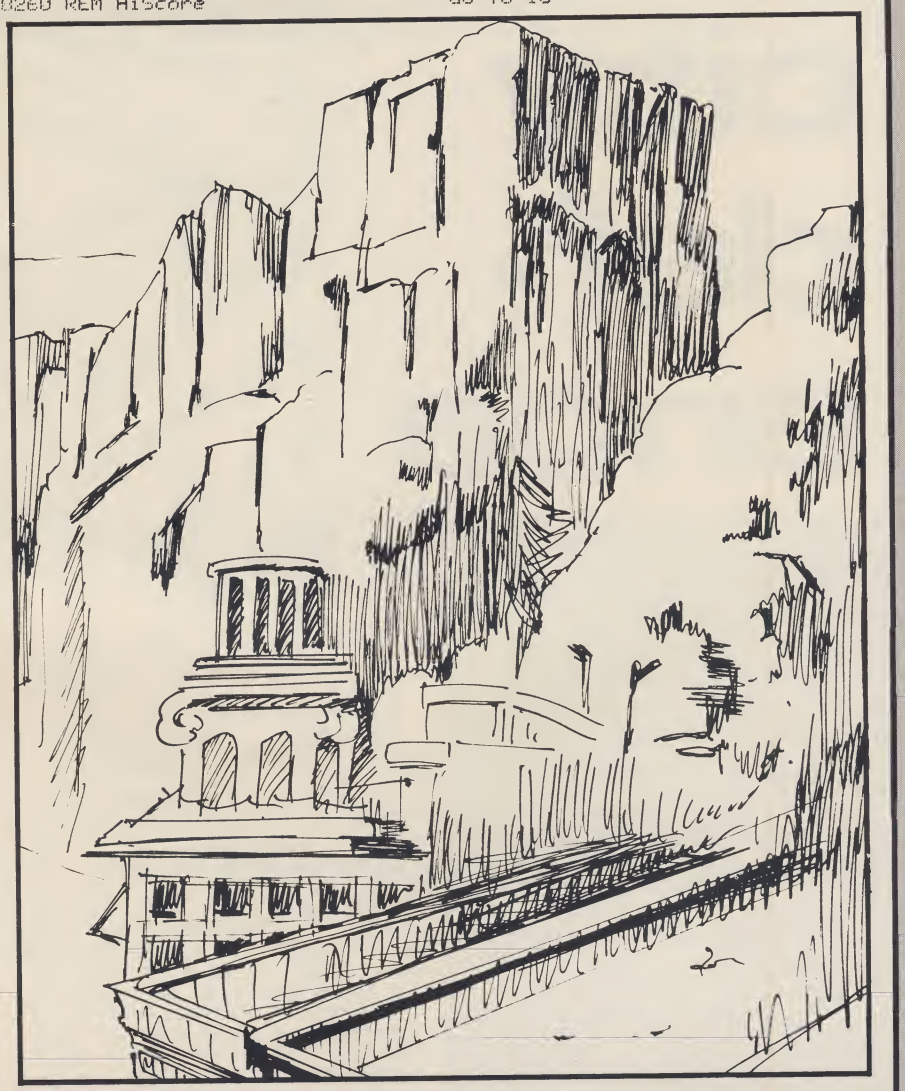
DEFEND your city and its nine laser bases at the bottom of the screen from the falling meteors. If you touch a meteor with your sights your lasers will fire and destroy it. Move up with Q, down with Z, right with P, and left with I. Move diagonally with the appropriate combinations of those keys.

You can also move through the three zones of your airspace very quickly by pressing 1, 2 or 3 as appropriate. The game becomes progressively more difficult and one meteor can destroy your entire city.

Tim Wolverson of Rotherham, South Yorkshire, who wrote **City Defence** for the 16K Spectrum, says his highest score so far is 3,360.

```
  20 REM "CITY DEFENCE"
  30 DIM h$(5,6): DIM n$(5,3): F
OR i=1 TO 5: LET h$(i)="000000":
 LET n$(i)="---": NEXT i
  35 GO SUB 1000
  40 BORDER 0: PAPER 0: INK 7: B
RIGHT 0: OVER 0: INVERSE 0: FLAS
H 0: CLS
  50 PRINT AT 1,8; INK 2; BRIGHT
 1;"W O L V O S O F T";AT 3,13;
INK 3;"Presents"
  55 PRINT AT 19,16; INK 6; BRIG
HT 1;"b"
  60 FOR i=1 TO 5: FOR j=1 TO 7:
 PRINT AT 5,11; INK j;"city defe
nce": FOR k=1 TO 20: NEXT k: NE
XT j: NEXT i: PRINT AT 5,11; INK
 4; BRIGHT 1;"city defence"
  70 FOR i=1 TO 500: NEXT i
  71 FOR i=7 TO 0 STEP -1: BEEP
.01,-10: INK i: BRIGHT 1: PLOT 1
32,24: DRAW 1,104: PLOT 132,24:
DRAW -40,104: PLOT 132,24: DRAW
48,104: PAUSE 5: PRINT AT 5,11;"
city defence": BEEP .01,-20: NEX
T i
  72 INK 7: BRIGHT 0: PRINT AT 5
,11; INK 2; BRIGHT 1;"city defen
ce"
  73 FOR i=1 TO 1000: NEXT i
  80 CLS : RESTORE 80: FOR i=1 T
O 5: READ c$,x: PRINT AT x,12; I
NK 3; BRIGHT 1;c$: FOR j=1 TO 10
0: NEXT j: NEXT i
  90 DATA "Q.......UP",6,"Z.....
DOWN",8,"I.....LEFT",10,"P....RI
GHT",12,"1-3..ZONEx",14
 100 FOR i=1 TO 5: FOR j=1 TO 7:
 PRINT AT 3,9; INK j;"mission co
ntrols": PAUSE 5: NEXT j: FOR j=
6 TO 2 STEP -1: PRINT AT 3,9; IN
K j;"mission controls": PAUSE 5:
 NEXT j: NEXT i
 110 FOR i=1 TO 500: NEXT i
```

```
 120 CLS : LET x=0: FOR i=1 TO 5
 : PRINT AT i+5+x,11; INK 4;h$(i
 );"  ";n$(i): LET x=x+1: NEXT i
 130 FOR j=1 TO 5: FOR i=1 TO 6:
 PRINT INK i;AT i,11;"T O D A Y'
 S";AT 3,9;"G R E A T E S T": FOR
  k=1 TO 25: NEXT k: NEXT i: NEXT
  j
 140 PRINT AT 17,0; INK 5;" Pres
 s a key to start,before thetimer
  expires:"
 150 LET t=15
 160 LET t$="00"( TO 2-LEN (STR$
 t))+STR$ t
 170 PRINT AT 18,15; INK 7;t$: P
 AUSE 50: LET t=t-1: IF t=-1 THEN
  GO TO 40
 180 IF INKEY$="" THEN GO TO 160
 185 LET s=0: LET v=0
 190 CLS : GO SUB 8000: LET v=v+
 1
 200 LET x=11: LET y=16: LET c=1
 210 DIM a(5): DIM b(5): DIM d(5
 ): DIM l(5): FOR i=1 TO 5: LET b
 (i)=175: LET a(i)=INT (RND*250):
  LET d(i)=(INT (RND*3)+1)-2: LET
  l(i)=1: NEXT i
 300 REM Main loop
 310 PRINT AT x,y; INK 6; OVER 1
 ;"h": BEEP .01,0
 315 FOR i=1 TO 5: IF l(i)=0 THE
 N GO TO 340
 317 LET o=a(i)+(d(i)*v): IF o>2
 55 THEN LET a(i)=0
 318 IF o<0 THEN LET a(i)=255
 320 PLOT INK 2; BRIGHT 1;a(i),b
 (i): DRAW INK 2; BRIGHT 1;d(i)*v
 ,-v: LET a(i)=a(i)+(v*d(i)): LET
  b(i)=b(i)-v
 335 IF 21-INT ((b(i)/8)+.5)=x A
 ND INT ((a(i)/8)+.5)=y THEN LET
 l(i)=0: GO SUB 8100
 337 IF b(i)<=24 THEN GO TO 8200
 340 NEXT i
 345 PRINT AT x,y; INK 2; BRIGHT
 1; OVER 1;"h"
 350 IF IN 57342=254 THEN LET y=
 y+1: GO SUB 9000
 360 IF IN 57342=251 THEN LET y=
 y-1: GO SUB 9000
 370 IF IN 64510=254 THEN LET x=
 x-1: GO SUB 9000
 380 IF IN 65278=253 THEN LET x=
 x+1: GO SUB 9000
 385 IF INKEY$="1" THEN LET x=4
 386 IF INKEY$="2" THEN LET x=10
 387 IF INKEY$="3" THEN LET x=17
 390 LET s$="000000"( TO 6-LEN (
 STR$ s))+STR$ s
 400 PRINT AT 21,0; INK 1; PAPER
  3;"SCORE ";s$; INK 7; PAPER 0;
 BRIGHT 1;AT 5,0;"↑1";AT 11,0;"↑2
 ";AT 18,0;"↑3"
 405 IF c=6 THEN FOR i=1 TO 30:
 BEEP .003,i: NEXT i: GO TO 190
 410 GO TO 300
1000 REM U.D.G.s
1010 RESTORE 1000: FOR j=1 TO 15
 : READ c$: FOR i=0 TO 7: READ b:
  POKE USR c$+i,b: NEXT i: NEXT j
 : RETURN
1020 DATA "b",24,b,b,60,102,66,0
,b,"c",126,254,192,b,b,b,254,126
,"d",252,254,198,b,b,b,254,252,"
e",254,b,192,248,192,b,254,b
1030 DATA "f",254,b,192,248,192,
b,b,b,"h",24,b,b,255,b,24,b,b,"i
",254,b,16,b,b,b,254,b
1040 DATA "l",192,b,b,b,b,b,254,
b,"m",198,238,254,214,198,b,b,b
1050 DATA "n",198,230,b,214,b,20
6,b,198,"o",124,254,198,b,b,b,25
4,124,"q",198,108,56,16,b,b,b,b,
"r",124,252,198,b,252,248,204,19
8
1060 DATA "s",126,254,192,252,12
6,6,254,252,"t",254,b,16,b,b,b,b
,b
8000 PRINT AT 19,0; PAPER 0; INK
  3; INVERSE 1;"    bbb         bb
b        bbb
8010 RETURN
8100 REM Explosion
8110 FOR j=7 TO 2 STEP -1: INK j
 : BRIGHT 1: BEEP .003,30-j
8120 PLOT 132,24: DRAW a(i)-132,
b(i)-24
8130 PLOT 44,24: DRAW a(i)-44,b(
i)-24
8135 PLOT 212,24: DRAW a(i)-212,
b(i)-24
8137 PRINT AT x-1,y;"(193)";AT x
,y-1;"(3*isP)";AT x+1,y;"(93)"
8140 NEXT j
8150 OVER 1: PLOT 132,24: DRAW a
(i)-132,b(i)-24: PLOT 44,24: DRA
W a(i)-44,b(i)-24: PLOT 212,24:
DRAW a(i)-212,b(i)-24: OVER 0: B
RIGHT 0
8155 PRINT AT x-1,y;" ";AT x,y-1
;" h ";AT x+1,y;" "
8160 LET s=s+(c*v*10): LET c=c+1
8165 INK 7
8170 RETURN
8200 REM End Game
8210 FOR j=1 TO 5: FOR i=1 TO 7:
 PRINT INK i; PAPER 3;AT 19,4;"b
bb         bbb         bbb": NEXT i
 : NEXT j: PRINT OVER 1; INK 1; P
APER 3;AT 19,4;"***";AT 19,15;"*
**";AT 19,25;"***"
8220 FOR i=1 TO 10: BEEP .01,-10
 : BEEP .01,-20: NEXT i
8230 FOR j=1 TO 5: FOR i=0 TO 7:
 PRINT AT 21,0; INK i; PAPER 3;"
SCORE ";s$: FOR k=0 TO 10: NEXT
k: NEXT i: NEXT j
8235 PRINT AT 11,12; INK 7; BRIG
HT 1;"GAME OVER"
8240 FOR i=1 TO 500: NEXT i
8250 IF s<VAL h$(5) THEN GO TO 1
20
8260 REM HiScore
8270 CLS : LET h$(5)=s$: LET m$=
"": LET l=15
8280 RESTORE 8900: FOR i=1 TO 6:
 READ d,f,c$: PRINT AT d,f; INK
4; BRIGHT 1;c$: FOR j=1 TO 50: N
EXT j: NEXT i
8290 PRINT AT 14,l; INK 7;"^"
8300 LET a$=INKEY$: IF a$="" THE
N GO TO 8290
8305 IF a$=CHR$ 13 THEN GO TO 82
90
8310 PRINT AT 13,l; INK 5; BRIGH
T 1;a$: BEEP .003,20
8320 LET m$=m$+a$: PRINT AT 14,l
;" ": LET l=l+1: FOR i=1 TO 50:
NEXT i: IF l=18 THEN GO TO 8500
8340 GO TO 8290
8500 REM Bubblesort
8505 LET n$(5)=m$
8510 LET k=0: FOR i=1 TO 4: IF V
AL h$(i)<VAL h$(i+1) THEN GO TO
8550
8520 NEXT i: IF k=1 THEN GO TO 8
510
8530 GO TO 120
8550 LET i$=h$(i): LET o$=n$(i):
 LET h$(i)=h$(i+1): LET n$(i)=n$
(i+1): LET h$(i+1)=i$: LET n$(i+
1)=o$: LET k=1: GO TO 8520
8900 DATA 1,12,"WELL DONE",3,1,"
YOUR SCORE IS GOOD ENOUGH TO BE"
,5,1,"PUT INTO THE HIGH SCORE TA
BLE.",8,1,"SELECT THE INITIAL DE
SIRED FROM",10,1,"THE KEYBOARD."
,13,15,"---"
9000 IF y<0 THEN LET y=31
9010 IF y>31 THEN LET y=0
9020 IF x<0 THEN LET x=0
9030 IF x>18 THEN LET x=18
9050 RETURN
9999 POKE 23658,40: RANDOMIZE
GO TO 10
```



U.F.O.



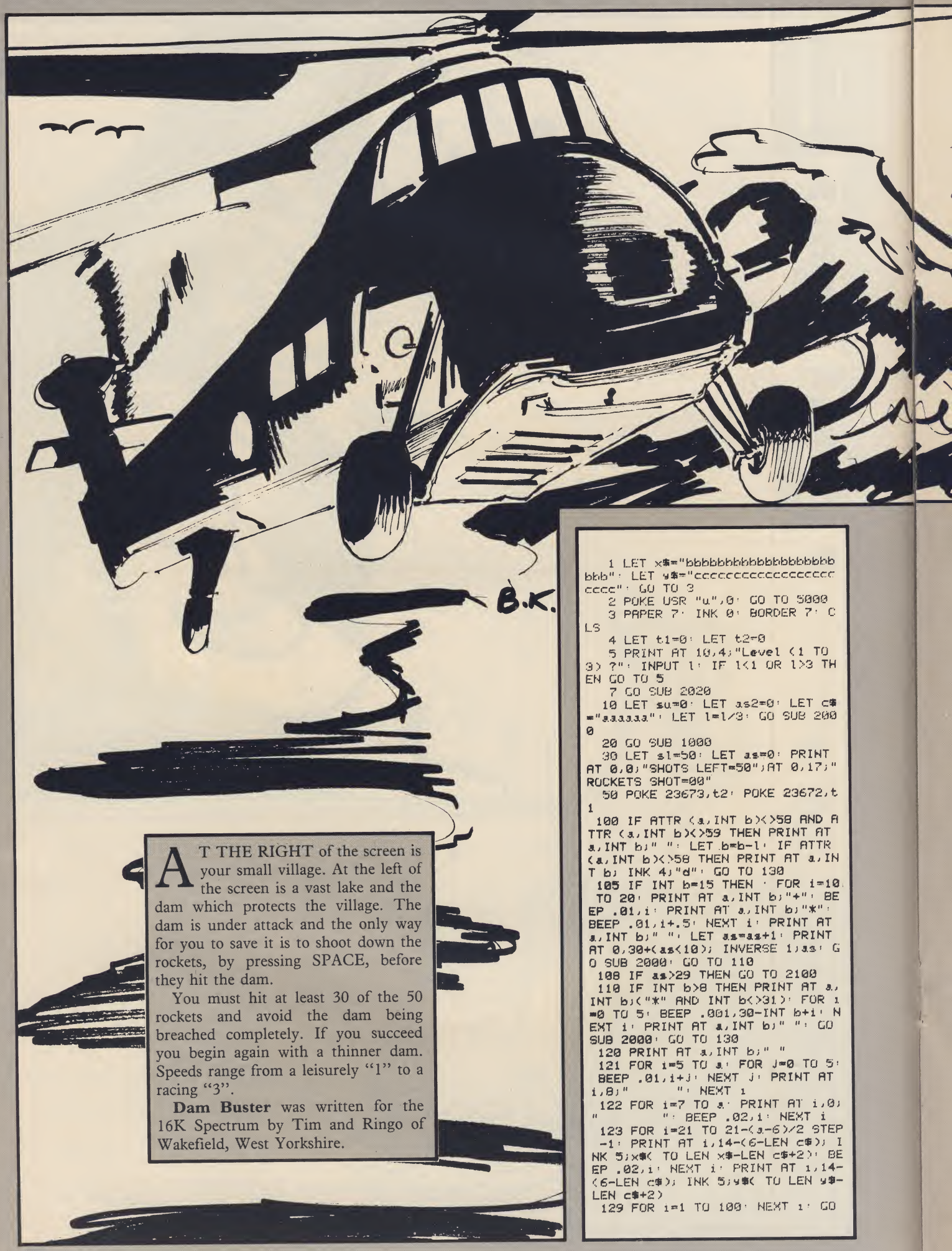
THE UFOs are flying overhead and you must shoot down as many of them as possible by pressing "m". They fly at varying speeds and heights and the further away and the faster they are, the higher your score.

If you miss a shot you will move down the screen, thus making the game more difficult. Once you reach the bottom of the screen the game ends. Whenever a **UFO** escapes you lose a point.

Written for the 16K Spectrum by Kristofer Gamstedt of Erebro, Sweden.

```
  10 FOR n=1 TO 8: READ a$: FOR
f=0 TO 7: READ a: POKE USR a$+f,
a: NEXT f: NEXT n
  20 DATA "a",252,21,63,255,255,
63,31,252,"b",0,255,245,245,245,
241,255,0,"c",0,255,17,117,52,11
3,255,0,"d",0,192,240,254,254,24
0,192,0
  30 DATA "e",0,3,31,127,127,31,
3,0,"f",63,240,252,255,255,252,2
40,63,"g",0,0,0,0,0,255,255,255,
"h",24,24,24,24,255,255,255,255
  40 LET v$="ABCD": LET h$="EBCF
": LET s$="GHC": LET score=0: LE
T y=5: LET p=0
  45 LET l=0
  50 BORDER 0: PAPER 0: INK 7: C
LS
  52 PRINT AT 0,0; PAPER 7; INK
2;" ABCD UFO EBCF ": PRINT AT 21
,12;"SCORE=": GO SUB 300
  55 PRINT AT y,14; INK 7;s$

  56 PRINT AT 21,10;score;"  "
  70 PRINT AT r,k;"   "
  80 IF h=1 AND k>27-ra THEN LET
 score=score-1: GO SUB 300
  90 IF h=2 AND k<ra THEN LET sc
ore=score-1: GO SUB 300
 100 IF h=1 THEN LET k=k+ra
 110 IF h=2 THEN LET k=k-ra
 120 PRINT AT r,k; INK 4;a$
 130 IF p=1 THEN GO SUB 400: GO
TO 150
 140 IF INKEY$="M" OR INKEY$="m"
 THEN LET p=1: LET y1=y-1: BEEP
.1,-10: GO TO 130
 150 GO TO 55
 300 IF RND>.5 THEN LET h=1: LET
 a$=v$: LET k=0: GO TO 315
 305 LET h=2: LET a$=h$: LET k=2
7
 315 LET ra=INT (RND*4)+1
 320 LET r=INT (RND*(y-2))+1: RE
TURN
 400 PRINT AT y1,15;" "
 410 IF ATTR (y1-1,15)<>4 THEN G
O TO 445
 420 PRINT AT r,k;"   "
 430 LET score=score+ra*(y-y1)+5
  BEEP .5,10: GO SUB 300
 440 LET p=0: RETURN
 445 IF y=20 AND y1=1 THEN BEEP
2,-20: GO TO 490
 450 IF y1=1 THEN PRINT AT y,14;
"   ": LET y=y+1: GO TO 440
 460 LET y1=y1-1
 470 PRINT AT y1,15; INK 6;"!"
 480 RETURN
 490 INPUT "Another go?";i$: IF
i$(1)="y" THEN PAUSE 100: GO TO
40
```



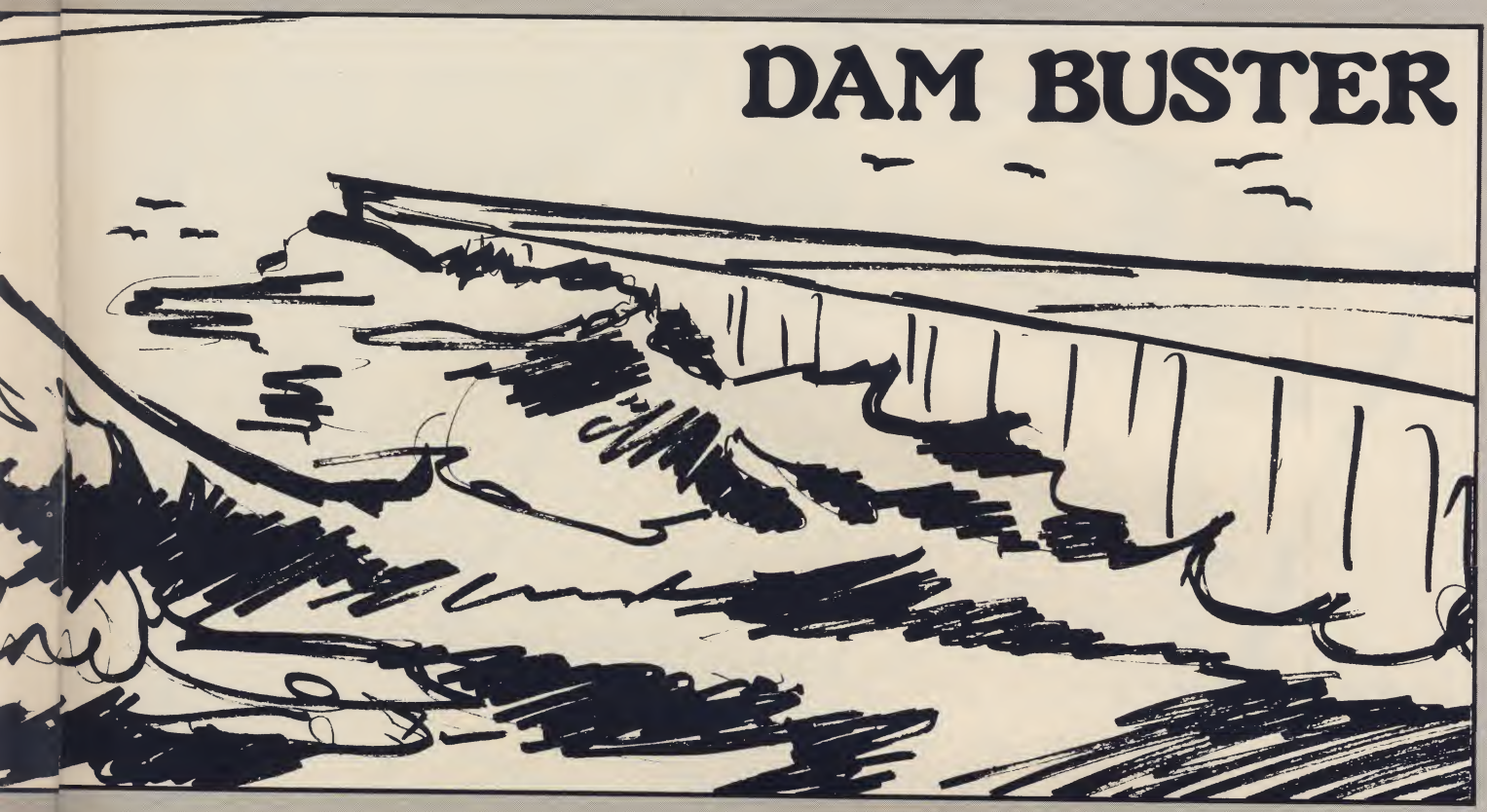
AT THE RIGHT of the screen is your small village. At the left of the screen is a vast lake and the dam which protects the village. The dam is under attack and the only way for you to save it is to shoot down the rockets, by pressing SPACE, before they hit the dam.

You must hit at least 30 of the 50 rockets and avoid the dam being breached completely. If you succeed you begin again with a thinner dam. Speeds range from a leisurely "1" to a racing "3".

Dam Buster was written for the 16K Spectrum by Tim and Ringo of Wakefield, West Yorkshire.

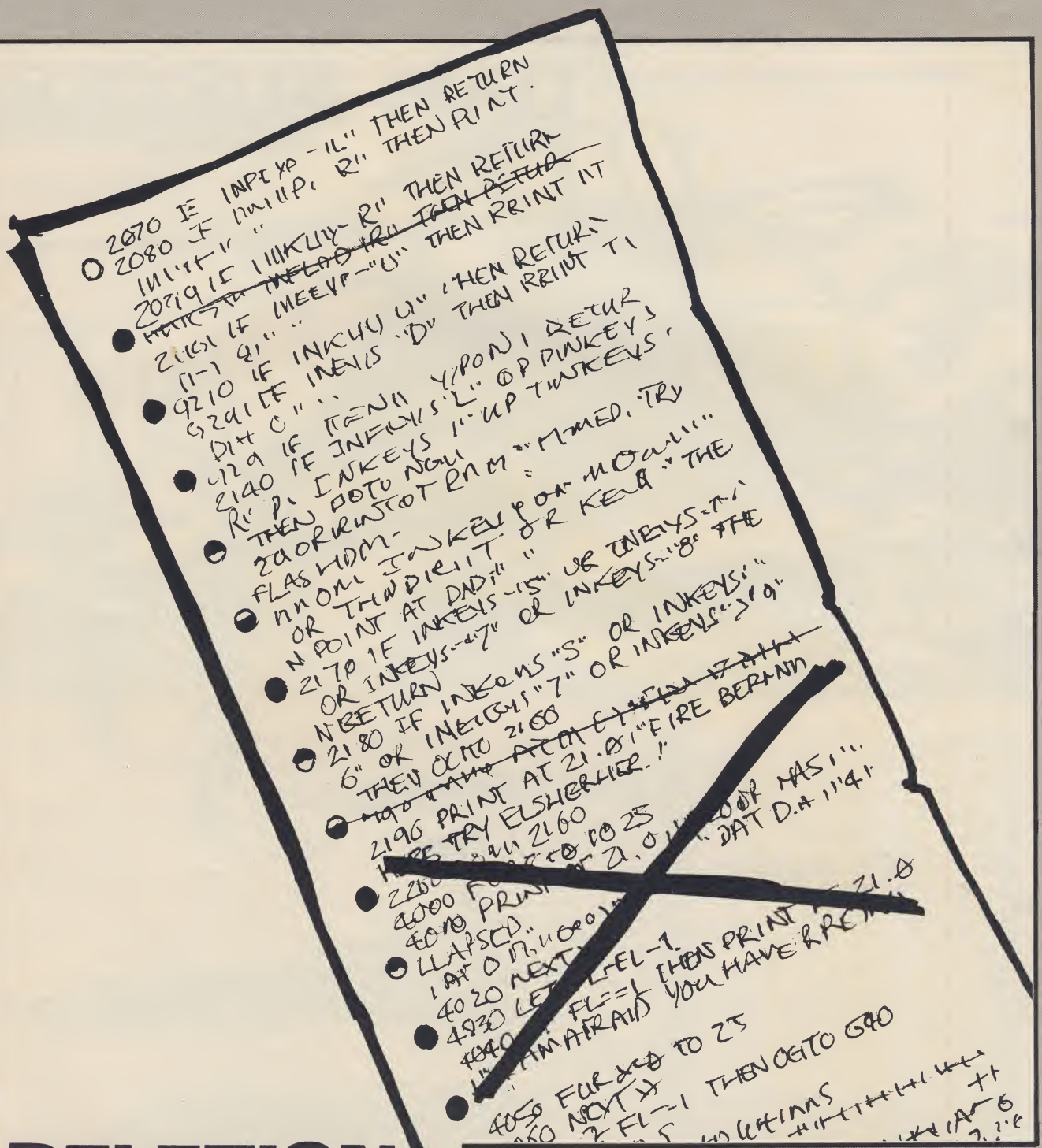
```
   1 LET x$="bbbbbbbbbbbbbbbbbbb
bbb": LET y$="ccccccccccccccccc
cccc": GO TO 3
   2 POKE USR "u",0: GO TO 5000
   3 PAPER 7: INK 0: BORDER 7: C
LS
   4 LET t1=0: LET t2=0
   5 PRINT AT 10,4;"Level (1 TO
 3) ?": INPUT l: IF l<1 OR l>3 TH
EN GO TO 5
   7 GO SUB 2020
  10 LET su=0: LET as2=0: LET c$
="aaaaaa": LET l=l/3: GO SUB 200
0
  20 GO SUB 1000
  30 LET s1=50: LET as=0: PRINT
AT 0,0;"SHOTS LEFT=50";AT 0,17;"
ROCKETS SHOT=00"
  50 POKE 23673,t2: POKE 23672,t
1
 100 IF ATTR (a,INT b)<>58 AND A
TTR (a,INT b)<>59 THEN PRINT AT
a,INT b;" ": LET b=b-l: IF ATTR
(a,INT b)<>58 THEN PRINT AT a,IN
T b; INK 4;"d": GO TO 130
 105 IF INT b=15 THEN  FOR i=10
 TO 20: PRINT AT a,INT b;"+": BE
EP .01,i: PRINT AT a,INT b;"*":
BEEP .01,i+.5: NEXT i: PRINT AT
a,INT b;" ": LET as=as+1: PRINT
AT 0,30+(as<10); INVERSE 1;as: G
O SUB 2000: GO TO 110
 108 IF as>29 THEN GO TO 2100
 110 IF INT b>8 THEN PRINT AT a,
INT b;("*" AND INT b<>31): FOR i
=0 TO 5: BEEP .001,30-INT b+i: N
EXT i: PRINT AT a,INT b;" ": GO
SUB 2000: GO TO 130
 120 PRINT AT a,INT b;" "
 121 FOR i=5 TO a: FOR J=0 TO 5:
 BEEP .01,i+J: NEXT J: PRINT AT
i,8;"       ": NEXT i
 122 FOR i=7 TO a: PRINT AT i,0;
"          ": BEEP .02,i: NEXT i
 123 FOR i=21 TO 21-(a-6)/2 STEP
 -1: PRINT AT i,14-(6-LEN c$); I
NK 5;x$( TO LEN x$-LEN c$+2): BE
EP .02,i: NEXT i: PRINT AT i,14-
(6-LEN c$); INK 5;y$( TO LEN y$-
LEN c$+2)
 129 FOR i=1 TO 100: NEXT i: GO
```

DAM BUSTER



```
TO 3000
 130 IF INKEY$=" " AND sl THEN L
ET sl=sl-1: PRINT AT 0,11; INVER
SE 1;("0" AND sl<10);sl  PLOT 12
3,16: DRAW INK 3;0,140: LET i=US
R 32560: PLOT OVER 1;123,16: DRA
W OVER 1; INK 3;0,140
 200 GO TO 100
1000 PRINT AT 5,8; INK 2;c$( TO
LEN c$-1): FOR i=6 TO 21: PRINT
AT i,8; INK 2;c$: NEXT i
1010 PRINT AT 7,0; INK 5;"ccccccc
cc": FOR i=8 TO 21: PRINT AT i,0
; INK 5;"bbbbbbbb": NEXT i
1020 PRINT AT 20,15;"e";AT 21,15
;"f"
1030 PRINT AT 21,20; INK 1;"999h
1999";AT 20,24;"j"
1100 RETURN
2000 LET a=9+INT (RND*7): LET b=
31
2010 RETURN
2020 FOR i=1 TO 8: RANDOMIZE USR
 32500: NEXT i: RETURN
2100 LET t1=PEEK 23672: LET t2=P
EEK 23673: PAPER 6: GO SUB 2020:
 BORDER 6: CLS
2150 LET su=su+(50-sl): LET as2=
as2+as
2200 PRINT AT 5,8; INK 2;"Well D
one!";AT 8,4; INK 1;"You have cl
eared this";AT 10,6;"Phase of ro
ckets"
2205 PRINT AT 13,4;"You have sho
t ";as2;AT 15,5;"rockets so far"
;AT 17,4;"You have used ";su;AT
19,6;"shots so far"
2207 RANDOMIZE USR 32530
2210 PRINT AT 21,5; FLASH 1;"Pre
ss any key": PAUSE 1: PAUSE 0
2500 LET c$=c$( TO LEN c$-1): PR
INT AT 21,5; OVER 1; PAPER 6;"
                ": IF LEN c$>1 THEN G
O SUB 2020: PAPER 7: INK 0: BORD
ER 7: CLS : GO SUB 2000: GO SUB
1000: GO TO 30
2600 GO SUB 2020: PRINT AT 4,4;
INK 2;"CONGRATULATIONS !";AT 6,0
;"YOU HAVE COMPLETED YOUR MISSIO
N": LET i=0: GO TO 3030
3000 LET t2=PEEK 23673: LET t1=P
EEK 23672: PAPER 6: GO SUB 2020:
 BORDER 6: CLS
3010 LET as2=as2+as: LET su=su+(
50-sl)
3020 LET i=1: PRINT AT 4,4; INK
2;"YOU HAVE FAILED !"
3030 PRINT AT 8,4;"You have shot
 ";as2;" rockets";AT 10,4;"You u
sed ";su;" shots"
3040 PRINT AT 12,4;"You took ";(
t2*256+t1)/50;" seconds"
3050 LET s=INT ((as2-(su-as2)/50)
: LET s=s*(s>0): PRINT AT 15,4;
BRIGHT 1;"You scored ";s
3055 IF i THEN BEEP 3,-30
3060 IF s>PEEK USR "u" THEN PRIN
T AT 17,4; FLASH 1;"NEW HIGH SCO
RE": RANDOMIZE USR 32530: POKE U
SR "u",s*(s<256)+255*(s>255)
3070 PRINT AT 19,4; INVERSE 1;"H
IGH SCORE=";PEEK USR "u"
3080 PRINT AT 21,4;"PRESS ANY KE
Y": PAUSE 1: PAUSE 0
3090 PRINT AT 15,4; OVER 1;"
                ";AT 17,4;"
   ";AT 19,4;"                ": G
O SUB 2020: GO TO 1
5000 PAPER 7: INK 0: BRIGHT 0: F
LASH 0: INVERSE 0: OVER 0: BORDE
R 7: CLEAR 32499: PRINT AT 10,5;
"Please wait a moment"
5005 RESTORE 5010: FOR i=USR "a"
 TO USR "J"+7: READ a: POKE i,a:
 NEXT i
5010 DATA 0,254,130,130,130,130,
130,254,102,153,255,255,102,153,
255,255,12,62,127,255,255,255
5020 DATA 255,255,1,3,127,255,25
5,127,3,1,0,16,16,56,16,56,16,56
,56,56,108,198
5030 DATA 238,214,186,124,16,56,
124,254,84,124,84,124,0,42,85,17
1,255,156,148,247,204,252
5040 DATA 252,252,252,204,204,20
4,0,0,0,48,120,252,252,204
6000 RESTORE 6050
6010 FOR x=1 TO 3: LET tot=0: RE
AD b: FOR i=b TO 1e9: READ a: IF
 a<256 THEN POKE i,a: LET tot=to
t+a: NEXT i
6020 IF tot<>a THEN PRINT "ERROR
 IN DATA IN LINE ";6050*(b=32500
)+6060*(b=32530)+6070*(b=32560):
 BEEP 3,-30: STOP
6030 NEXT x
6050 DATA 32500,243,33,0,64,6,24
,197,6,0,126,203,39,119,35,16,24
9,193,16,243,251,201,2264
6060 DATA 32530,6,10,197,6,150,3
3,100,0,17,3,0,35,197,229,213,20
5,181,3,209,225,193,16,244,193,1
6,232,201,3114
6070 DATA 32560,6,200,33,30,0,17
,2,0,35,197,229,213,205,181,3,20
9,225,193,16,244,201,2439
6090 GO SUB 2020
7000 PRINT AT 0,10;: INVERSE 1:
LET i$="DAM BUST": GO SUB 8000:
INVERSE 0: PRINT AT 2,8;: LET i$
="  Tim & Ringo": GO SUB 8000
7010 PRINT AT 5,2;       LET i$
="Your mission is to protect the
village from the water behind
the dam.  To do this, you must
shoot all the rockets heading
towards the dam with your laser.
  Your laser only has enough
energy to fire 50 times and you
must shoot down at least 30
rockets,before they destroy your
dam.
  If you succeed,  you will face
another dam which is thinner.
There are 5 of these sheets."
7020 GO SUB 8000
7030 PRINT AT 19,1;: LET i$="PRE
SS SPACE TO FIRE YOUR LASER": GO
 SUB 8000
7040 PRINT #1;AT 1,5; FLASH 1;"P
ress any key to begin": PAUSE 1:
 PAUSE 0: PRINT #1;AT 1,5;"
                ": GO SUB 2020:
 GO TO 1
7999 STOP
8000 FOR i=1 TO LEN i$: PRINT i$
(i);: PAUSE 1+7*(i$(i)<>CHR$ 32)
: NEXT i: RETURN
9000 REM SAVE GAME

9010 CLEAR   SAVE "DAM BUST" LIN
E 2: PRINT AT 10,5;"Verifying":
VERIFY "DAM BUST"
```



DELETION ROUTINE

FREQUENTLY, when devising a program, complete sections of it have to be deleted at a time as the program progresses. David Maxwell of south-west London has written a **Deletion Routine** which will remove whole sections of a program at once. To use it GOTO 9900 and enter the first and last line numbers of the section you want deleted.

```
9900>REM DELETE by D.MAXWELL
9910 CLEAR 65499: RESTORE 9950:
LET a=65500

9920 READ n: IF n=257 THEN GO TO
 9970
9930 POKE a,n
9940 LET a=a+1: GO TO 9920

9950 DATA 33,0,0,229,33,0,0,35,2
05,110,25,227,205,110,25
9960 DATA 32,1,235,225,167,237,8
2,216,25,205,229,25,201,257
9970 CLS : PRINT "Start :";: INP
UT a: PRINT a

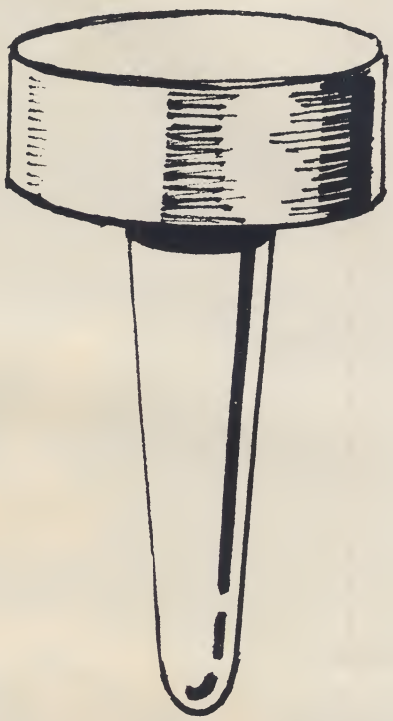
9975 PRINT "End   :";: INPUT b:
PRINT b
9980 POKE 65501,a-256*INT (a/256
): POKE 65502,INT (a/256)

9990 POKE 65505,b-256*INT (b/256
): POKE 65506,INT (b/256)
9995 RANDOMIZE USR 65500
```

SOLITAIRE

AFTER SEEING the **Solitaire** program in our August edition, K Sen Gupta of Bury, Lancashire submitted this version for the ZX-81. The aim is to end with only one peg remaining in the middle of the board.

Jump one peg over another into a space and the peg you have jumped will be removed. Enter aaaa for a demonstration game and qqqq to begin again.



```
  10 REM "SOLITAIRE"
  15 CLS
  20 FAST
  25 FOR A=2 TO 14 STEP 2
  30 FOR B=6 TO 10 STEP 2
  35 PRINT AT A,B;"o";AT B,A;"o"
;AT 8,8;"O"
  40 PRINT AT 0,0;A/2;AT 0,0;CHR
$ (A/2+27)
  45 NEXT B
  50 NEXT A
  55 SLOW
  60 PRINT AT 17,0;"EXAMPLE-  IN
PUT F4D4 MOVES PIECE F4 TO EMPTY
 SPACE D4, E4 AND F4 BECOME EMPT
Y.","  ENTER ""AAAA"" FOR PRE-R
ECORDED GAME."
  65 LET C=0
  70 INPUT I$
  75 FOR N=17 TO 21
  80 PRINT AT N,0;"
                    ";
  85 NEXT N
  90 IF I$="AAAA" THEN GOTO 1054
10*(INT (RND*2))
  95 LET A$=I$
 100 IF LEN I$<>4 THEN GOTO 70
 105 IF A$="0000" THEN GOTO 15
 110 LET Y1=2*(CODE A$-37)
 115 LET Y1=VAL A$(2)*2
 120 LET X2=2*(CODE A$(3)-37)
 125 LET Y2=VAL A$(4)*2
 130 LET X2=(X1+X3)/2
 135 LET Y2=(Y1+Y3)/2
 140 LET P=1+PEEK 16396+256*PEEK
 16397
 145 LET P$=CHR$ PEEK (33*X1+Y1+
P)
 150 LET C$=CHR$ PEEK (33*X2+Y2+
P)
 155 LET D$=CHR$ PEEK (33*X3+Y3+
P)
 160 IF B$<>"o" OR C$<>"o" OR D$
<>"O" THEN GOTO 70
 165 PRINT AT X1,Y1;"O";AT X2,Y2
;"O";AT X2,Y2;"o";AT C-16*INT (C
/16),20+6*INT (C/16);A$
 170 LET C=C+1
 175 IF I$="AAAA" THEN RETURN
 180 IF C<31 THEN GOTO 70
 185 LET Z$="D2D4B3D3C1C3D3B3A3C
3C4C2E1C1C1C3D5D3C6C4A5C5F5D5E7E
5E4E6C7E7E7E5E2E4C3E3D3F3C5C3C3E
3C4C6A4C4C3C5C6C4D6D4E4E6C4E4E3E
5E6E4F4D4"
 190 GOTO 200
 195 LET Z$="F4D4E6E4C5E5C3C5D5F
5C5E5D4F4E5D5C7C5D5B5A5C5C4C6E7C
7C7C5C3C4A3C3C4C2C1C2E1C1A4C4C4C
2C1C3E2C2C2C4C4C6C6E6E6E4F4D4D4D
2F3D3D2D4"
 200 FOR N=1 TO 21
 205 LET A$=Z$(4*N-3 TO 4*N)
 210 FOR X=1 TO 30
 215 NEXT X
 220 GOSUB 110
 225 NEXT N
```

REFUEL-LING

YOUR AIM is to keep the main ship flying for as long as possible. As the capacity of its fuel tanks is limited it is necessary for it to dock with the fuel-carrying cargo ship as often as possible. Press '1' to keep your ship on the level and to consume one unit of fuel, '2' to move it slowly upwards and consume two units of fuel, and '3' to move it quickly upwards consuming three units of fuel.

When no key is pressed the ship will fall earthwards quickly. The game ends if you crash or run out of fuel.

Refuelling was written for the 16K Spectrum by Miguel Pontes Garcia of Barcelona, Spain.

```
  2 POKE 23658,0: BORDER 7: PAP
ER 7: INK 2: CLS : PRINT AT 10,1
0; FLASH 1;"STOP THE TAPE"

  3 PRINT #0; FLASH 1;AT 0,0; B
RIGHT 1;"     Press any key to s
tart .    ": PAUSE 0: CLS : GO TO
 10
  4 PRINT AT 10,0;"Do you want
instructions? (y/n) ": PAUSE 0:
IF INKEY$<>"y" THEN GO TO 32

  6 GO SUB 2000
  7 GO TO 32
  8 PAUSE 1: IF INKEY$="" THEN
BORDER 0: BORDER 2: BORDER 6: BO
RDER 4: BORDER 5: BORDER 0: GO T
O 8
  9 RETURN
 10 REM initialisation

 15 CLEAR 32499

 20 BORDER 5: PAPER 5: INK 9: C
LS : PRINT FLASH 1; BRIGHT 1;AT
10,0;"Please wait,I'm making UDG
s and     placing M/C in memory
     ": PAUSE 50
 30 GO SUB 1000: GO TO 1200

 31 CLS : GO TO 4

 32 REM main loop

 35 CLS : LET h=0: LET l=14: BE
EP .2,30: BEEP .2,20: BEEP .2,30
: LET g=0: LET p=13: LET d=1: LE
T j=0: LET f$="      ": FOR i=0 T
O 6: RANDOMIZE USR 32529: NEXT i
 38 LET k=INT (RND*11)+3: PRINT
 INK 0;AT 21,0;"(3*isP)a(4*i93)b
(3*isP)a(4*i93)b(4*isP)a(6*i93)b
(2*isP)"
 40 FOR f=1 TO 25 STEP 1+INT (R
ND*2)
 42 PRINT AT 0,21;"Time=";g: LE
T g=g+1
 50 PRINT AT d,12;f$;AT d+1,12;
f$;AT d+1,p;"   ";AT d+2,p;"   "
;AT k,f;"   cde";AT l,12;"f9h1j"
;AT 0,0;"Fuel=";60-j;"    ": LET
 d=1: LET l=l+1
 70 REM main ship crashes

 80 IF l>=21 THEN GO TO 210

 85 REM reserve tank engaging

 90 IF j>=60 THEN PRINT AT 1,0;
FLASH 1;"Reserve"
 92 REM detects out of fuel
 95 IF j>=75 THEN GO TO 350

 97 REM detects contact
100 IF f=10 AND l-2=k THEN GO T
O 240
 101 REM Detects ships crash
 102 IF f>=6 AND f<=12 AND (l-1=
k OR l=k) THEN GO TO 310
 103 REM resets Power display
 105 PRINT AT 1,12;"______";AT 0
,12;"Power"
 107 REM keyboard scanning
 110 LET x=IN 63486: IF x=251 TH
EN BEEP .1,-20: GO TO 160
 113 IF x=253 THEN BEEP .1,-10:
GO TO 200
 115 IF x=254 THEN BEEP .1,0: GO
 TO 260

 120 IF l<3 THEN LET l=3
 130 PRINT AT 1,7;f$
 140 NEXT f

 145 PRINT AT k,f+1;f$
 147 REM main loop ends here
 150 GO TO 38
 155 REM full ascensional power
 160 LET l=l-3
 170 PRINT AT l+3,p;"kkk";AT 1,1
2;"(6*isP)";AT 0,12;"Power": LET
 j=j+3
 200 GO TO 120

 205 REM main ship crashes
 210 PRINT FLASH 1; INK 2; PAPER
 6;AT 19,12;"llllll";AT 20,13;"ll
l": PRINT AT 21,11;"(isP)a(i93)l
(2*i93)": FOR i=0 TO 10: RANDOMI
ZE USR 32529: NEXT i: PAUSE 100:
 GO TO 35
 220 REM contact routine

 240 PRINT AT l,11;"CONTACT": FO
R i=0 TO 2: RANDOMIZE USR 32500:
 NEXT i: PAUSE 25: PRINT AT l,11
;"         ": LET h=h+1: PRINT AT
1,21;"Contacts=";h: LET j=0: GO
TO 140
 250 REM low ascensional Power
 260 LET l=l-1: LET j=j+1: PRINT
 AT l+1,14;"k";AT 1,12;"(2*isP)_
___";AT 0,12;"Power": GO TO 120
 270 REM medium Power

 280 LET l=l-2: PRINT AT l+2,13;
"k k";AT 1,12;"(4*isP)__";AT 0,1
2;"Power": LET j=j+2: GO TO 120
 300 REM both ships crash
 310 PRINT AT d,12;f$: FLASH 1:
PRINT INK 2; PAPER 6;AT k,f+3;"l
ll";AT k+1,f+4;"l";AT k-1,f+4;"l
";AT l,12;"llllll";AT l+1,13;"lll
";AT l-1,13;"lll";AT l+2,14;"l";
AT l-2,14;"l": FLASH 0: FOR i=0
TO 10: RANDOMIZE USR 32529: RAND
OMIZE USR 32500: NEXT i: PAUSE 1
00: GO TO 35
 320 STOP
 999 REM User defined graphics
1000 FOR f=USR "a" TO USR "l"+7
1010 READ g: POKE f,g: BEEP .01,
30: NEXT f
1020 DATA 128,192,224,224,255,25
5,255,255
1030 DATA 1,7,15,63,255,255,255,
255
1040 DATA 31,49,119,243,247,119,
55,31
1050 DATA 255,81,87,83,87,87,17,
255
1060 DATA 248,124,126,127,127,12
6,28,248
1070 DATA 0,0,6,31,63,31,0,0
1080 DATA 3,63,127,255,255,255,1
6,56
1090 DATA 255,255,255,255,255,25
5,16,56
1100 DATA 192,252,254,255,255,25
5,16,56
1110 DATA 0,0,96,251,252,254,4,3
1120 DATA 24,24,60,126,60,24,74,
40
1130 DATA 129,82,37,200,120,36,9
2,161
1140 RETURN
1150 REM M/C sound routines
1200 FOR a=0 TO 55
1205 READ b
1210 POKE 32500+a,b  BEEP .01,10
: NEXT a
1220 DATA 6,1,197,33,15,0,17,20,
0,229,205,181,3,225,17,16,0,167,
237,90,125,254,255,32,227,193,16
,230,201: REM first sound
1230 DATA 0,6,1,197,33,0,3,17,1,
0,229,205,181,3,225,17,16,0,167,
237,82,32,240,193,16,232,201:
REM second sound
1240 GO TO 31
2000 REM instructions
2010 CLS : PRINT "    *** Stan r
efuelling ***      "
2020 PRINT '"    The idea of the
```

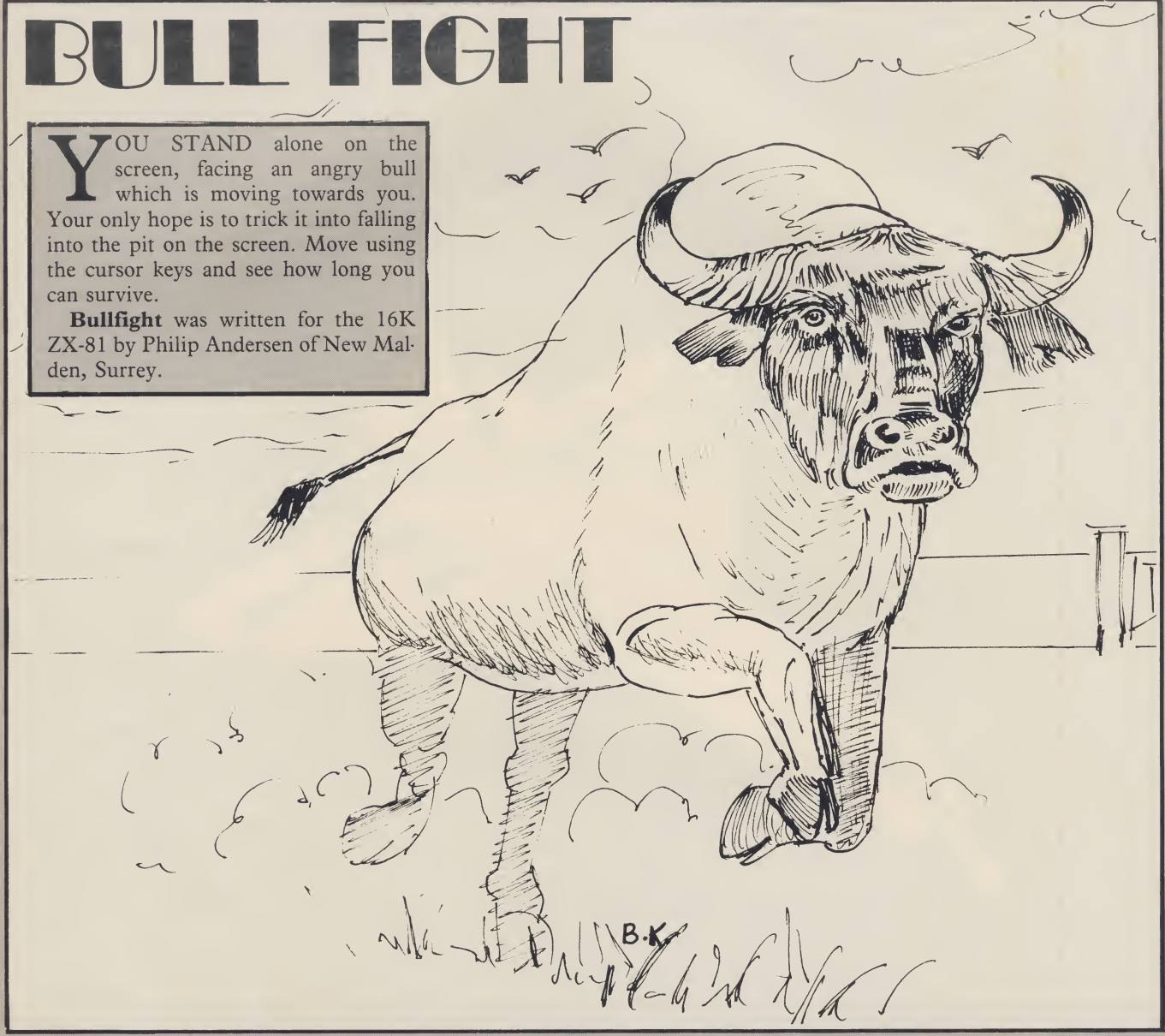


```
  Game is to  keep the main ship
(fghij)       flying as long as p
ossible.          As the fuel tan
ks of this    ship are limited,yo
u have to     meet the refuelling
 ship (cde)   to take fuel for yo
ur flight.        "
2030 PRINT '"     An encounter of
 two ships inthe space is a very
 hard work,   this is because the
 movements    are so much faster
than in the   atmosphere,but the
gravity is    also important,if y
ou leave the  controls you will c
rash.         "
2040 PRINT #0; FLASH 1;AT 0,0;"
  Press any key to continue     "
2045 GO SUB 9: BORDER 5
2050 CLS
2060 PRINT '''"The control keys a
re these:     ": PRINT '"     1 i
s to keep your ship at        the
 actual level.                The
 Power consumption is 1"
2070 PRINT '"     2 is to advance
 at low speed    this speed is i
deal to meet     the fuel ship.I
t consumes 2"
2080 PRINT '"     3 is for full s
peed.             It's Power cons
umption is 3"
2090 PRINT '''"You must approach
 to refuelling ship by the under
side of it,   otherwise you will
 crash.           "
2100 PRINT £0; FLASH 1;AT 0,0;"
  Press any key to continue     "
2105 GO SUB 0
2110 BORDER 5: CLS
3000 RETURN
3010 CLEAR : SAVE "Refuelling" L
INE 1
```

BULL FIGHT

YOU STAND alone on the screen, facing an angry bull which is moving towards you. Your only hope is to trick it into falling into the pit on the screen. Move using the cursor keys and see how long you can survive.

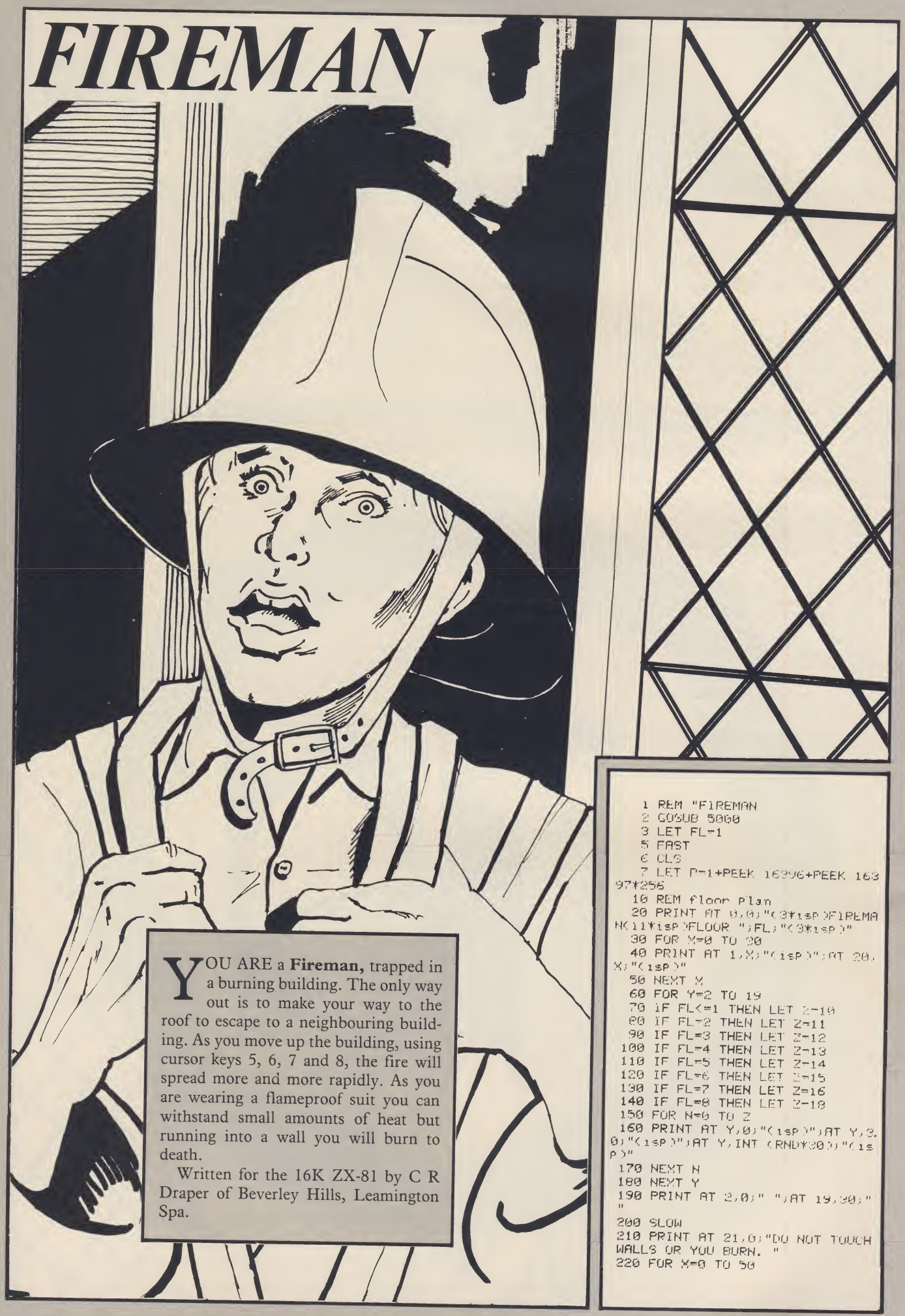
Bullfight was written for the 16K ZX-81 by Philip Andersen of New Malden, Surrey.




```
   1 CLS
   2 PRINT AT 0,0;"bullfight"
   3 PRINT AT 2,0;"YOU MUST MOVE
 YOUR BULLFIGHTER  AROUND THE AR
ENA TO ESCAPE THE  BULL WHICH IS
 RELENTLESSLY      PERSUING-YOU.
 YOUR ONLY HOPE IS TO MAKE HIM F
ALL INTO THE PIT   BY POSITIONIN
G IT BETWEEN YOU   AND HIM.USE T
HE KEYS 5,6,7 AND 8TO MOVE IN TH
E DIRECTIONS SHOWN BY THE ARROWS
."
   4 PRINT AT 13,1;"O=BULLFIGHTE
R",,,," *=BULL",,,," (shift)=PIT"
   5 PRINT AT 21,0;"ANY KEY TO S
TART"
   6 IF INKEY$="" THEN GOTO 6
   7 CLS
   8 POKE 16418,0
  10 FOR F=0 TO 31
  20 PRINT AT 0,F;"(9a)";AT 21,F
;"(9a)"
  30 NEXT F
  40 FOR F=1 TO 20
  50 PRINT AT F,0;"(9a)";AT F,31
;"(9a)"
  60 NEXT F
  70 LET S=0
  80 LET X=INT (RND*30+1)
  90 LET Y=INT (RND*20+1)
 100 LET A=INT (RND*30+1)
 110 LET B=INT (RND*20+1)
 120 LET M1=INT (RND*28+2)
 130 LET M2=INT (RND*18+2)
 135 PRINT AT B,A;"*"
 140 PRINT AT M2,M1;"(shift)"
 150 PRINT AT Y,X;" "
 160 LET X=X+(INKEY$="8")-(INKEY
$="5")
 170 LET Y=Y+(INKEY$="6")-(INKEY
$="7")
 171 LET X=X+(X<1)-(X>30)
 172 LET Y=Y+(Y<1)-(Y>20)
 180 PRINT AT Y,X;"O"
 190 IF RND>.7 THEN GOTO 240
 200 PRINT AT B,A;" "
 210 LET A=A+(A<X)-(A>X)
 220 LET B=B+(B<Y)-(B>Y)
 230 PRINT AT B,A;"*"
 240 IF A=X AND B=Y THEN GOTO 40
0
 250 IF A=M1 AND B=M2 THEN GOTO
600
 260 LET S=S+1
 270 GOTO 140
 400 GOSUB 800
 410 PRINT AT 0,0;"SCORE=";S
 415 PRINT AT 22,0;"RATING=";
 416 IF S<200 THEN PRINT "BULL F
ODDER"
 417 IF S>=200 AND S<440 THEN PR
INT "APPRENTICE"
 418 IF S>=440 AND S<660 THEN PR
INT "PICADOR"
 419 IF S>=660 AND S<1100 THEN P
RINT "MATADOR"
 420 IF S>=1100 THEN PRINT "TORE
ADOR"
 428 PRINT AT 23,0;"ANY KEY TO P
LAY AGAIN"
 429 IF INKEY$="" THEN GOTO 429
 430 PRINT AT B,A;" ";AT M2,M1;"
 "
 440 PRINT AT 0,0;"(10*9a)"
 445 PRINT AT 22,0;"
                   "
 446 PRINT AT 23,0;"
                    "
 450 GOTO 70
 600 GOSUB 800
 610 PRINT AT B,A;" "
 620 LET S=S+200
 630 FOR F=1 TO 60
 640 NEXT F
 650 GOTO 100
 800 FOR F=1 TO 8

 810 PRINT AT B,A;"(shift)";TAB RND
;AT B,A;"*"
 820 NEXT F
 830 RETURN
9998 SAVE "BULLFIGHT"
9999 RUN
```

FIREMAN



YOU ARE a **Fireman,** trapped in a burning building. The only way out is to make your way to the roof to escape to a neighbouring building. As you move up the building, using cursor keys 5, 6, 7 and 8, the fire will spread more and more rapidly. As you are wearing a flameproof suit you can withstand small amounts of heat but running into a wall you will burn to death.

Written for the 16K ZX-81 by C R Draper of Beverley Hills, Leamington Spa.

```
  1 REM "FIREMAN
  2 GOSUB 5000
  3 LET FL=1
  5 FAST
  6 CLS
  7 LET D=1+PEEK 16396+PEEK 163
97*256
 10 REM floor plan
 20 PRINT AT 0,0;"(3*isP)FIREMA
N(11*isP)FLOOR ";FL;"(3*isP)"
 30 FOR X=0 TO 20
 40 PRINT AT 1,X;"(isP)";AT 20,
X;"(isP)"
 50 NEXT X
 60 FOR Y=2 TO 19
 70 IF FL<=1 THEN LET Z=10
 80 IF FL=2 THEN LET Z=11
 90 IF FL=3 THEN LET Z=12
100 IF FL=4 THEN LET Z=13
110 IF FL=5 THEN LET Z=14
120 IF FL=6 THEN LET Z=15
130 IF FL=7 THEN LET Z=16
140 IF FL=8 THEN LET Z=18
150 FOR N=0 TO Z
160 PRINT AT Y,0;"(isP)";AT Y,2.
0;"(isP)";AT Y,INT (RND*30);"(is
P)"
170 NEXT N
180 NEXT Y
190 PRINT AT 2,0;" ";AT 19,30;"
"
200 SLOW
210 PRINT AT 21,0;"DO NOT TOUCH
WALLS OR YOU BURN. "
220 FOR X=0 TO 50
```

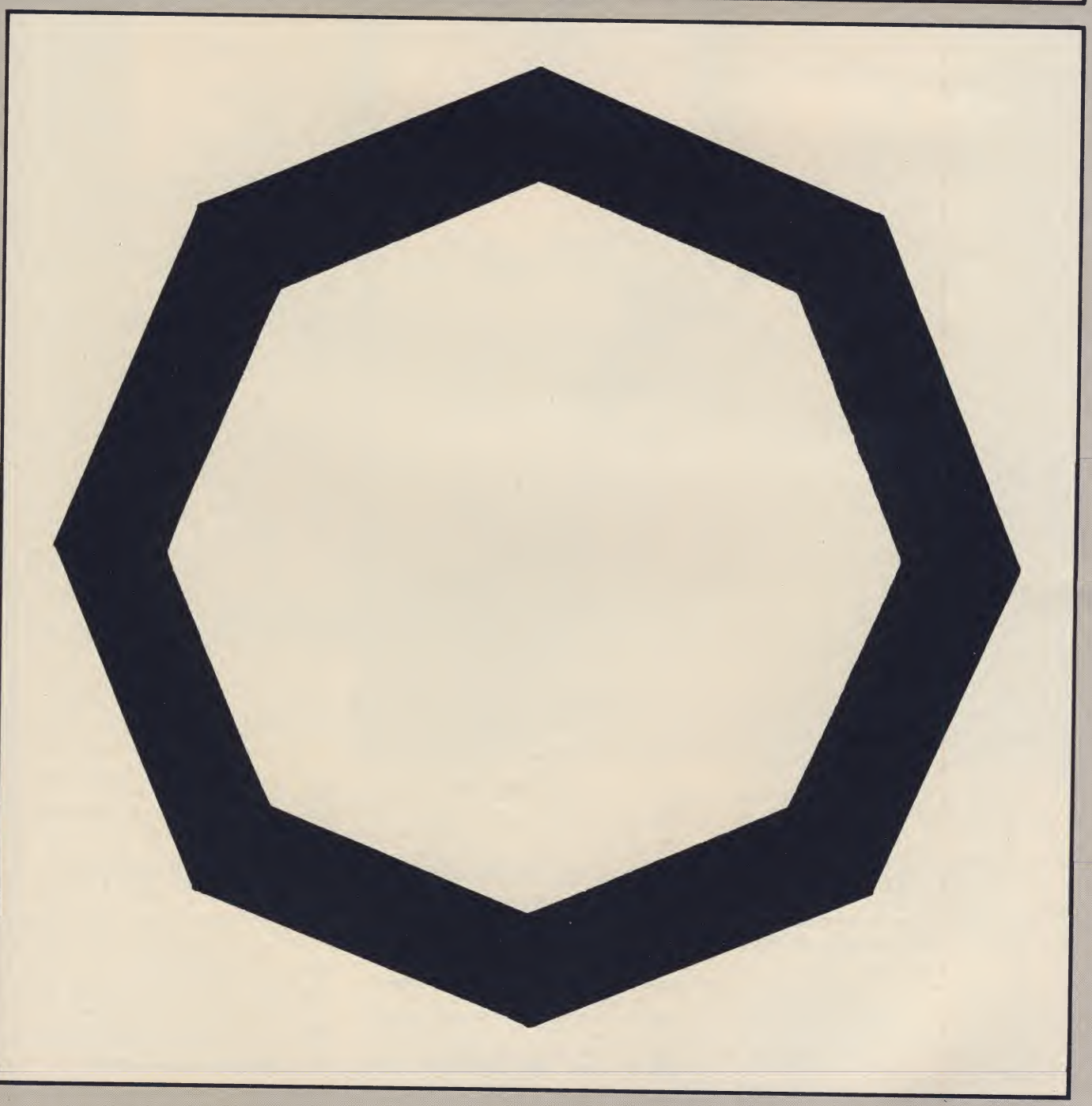
```
230 NEXT X
300 LET F=0
310 LET A=0
320 LET D=2
330 PRINT AT D,A;"*";AT D,A;" "
350 LET K=INT (RND*50)
360 IF A<10 AND D<6 THEN GOTO 4
80
370 IF K>A THEN GOTO 480
380 PRINT AT D,A;"*"
390 FOR N=1 TO 10
400 LET W=INT (RND*18)+2
410 LET F=F+1
420 PRINT AT W,F;"(9a)"
430 IF F=A AND W=D THEN PRINT A
T D,A;"(9a)"
440 IF F=A AND W=D THEN GOTO 46
00
450 IF F=29 THEN LET F=0
460 NEXT N
470 PRINT AT D,A;" "
480 PRINT AT 21,0;"IF YOU NEED
HELP PRESS KEY H.    "
490 IF INKEY$="H" THEN PRINT AT
D,A;"*"
500 IF INKEY$="H" THEN GOSUB 20
00
510 PRINT AT D,A;" "
520 LET A=A+(INKEY$="8")-(INKEY
$="5")
530 LET D=D+(INKEY$="6")-(INKEY
$="7")
540 LET P1=PEEK (P+33*D+A)
550 IF P1=128 THEN GOTO 600
560 PRINT AT D,A;"*"
570 IF D=19 AND A=30 THEN GOTO
1000
580 GOTO 330
600 PRINT AT 21,0;"CONTACT WITH
WALLS INSTANT DEATH"
610 FOR X=0 TO 50
620 NEXT X
630 PRINT AT 21,0;"NEW GAME? PR
ESS Y OR N.          "
640 IF INKEY$="" THEN GOTO 640
650 IF INKEY$="Y" THEN GOTO 3
660 IF INKEY$="N" THEN PRINT AT
21,0;"OKAY, BYE.
      "
670 FOR N=0 TO 25
680 NEXT N
690 CLS
700 PRINT AT 3,7;"**************
****";AT 4,7;"*                *"
;AT 5,7;"* F I R E M A N *";AT 6
,7;"*                *";AT 7,7;"*
****************"
710 STOP
1000 REM floor change
1010 LET FL=FL+1
1020 IF FL>0 THEN GOTO 1100
1030 PRINT AT 21,0;"GOING UP TO
FLOOR ";FL;"          "
1040 FOR X=0 TO 21
1050 SCROLL
1060 NEXT X
1070 GOTO 5
1100 REM roof escape
1110 CLS
1120 PRINT AT 21,0;"YOU HAVE MAD
E IT TO THE ROOF.    "
1130 FOR X=20 TO 5 STEP -1
1140 PRINT AT X,0;"(9a)";AT X,1;
"(9a)";AT X,2;"(9a)";AT X,3;"(9a
)";AT X,4;"(9a)";AT X,5;"(9a)";A
T X,21;"(15P)";AT X,22;"(15P)";A
T X,23;"(15P)"
1150 NEXT X
1160 FOR X=6 TO 20
1170 PRINT AT 5,X;"-"
1180 NEXT X
1190 LET A=4
1200 PRINT AT 4,A;"*";AT 4,A;" "
1220 LET A=A+(INKEY$="8")
1230 IF A=22 THEN GOTO 1250
1240 GOTO 1200
1250 FOR X=4 TO 20
1260 PRINT AT X,22;"*";AT X,22;"
"
1280 NEXT X
1290 CLS
1300 PRINT AT 10,0;"CONGRATULATI
ONS, YOU ESCAPED.    "
1310 GOTO 630
2000 REM help
2010 LET H=INT (RND*3)
2020 IF D<=5 AND A<=5 THEN LET H
=2
2030 IF H=0 THEN GOTO 2150
2040 IF H=1 THEN GOTO 2190
2050 IF H=2 THEN PRINT AT 21,0;"
WHERE DO YOU WISH TO GO? L,R,U,D
"
2060 IF INKEY$="L" THEN PRINT AT
D,A-1;" "
2070 IF INKEY$="L" THEN RETURN
2080 IF INKEY$="R" THEN PRINT AT
D,A+1;" "
2090 IF INKEY$="R" THEN RETURN
2100 IF INKEY$="U" THEN PRINT AT
D-1,A;" "
2110 IF INKEY$="U" THEN RETURN
2120 IF INKEY$="D" THEN PRINT AT
D+1,A;" "
2130 IF INKEY$="D" THEN RETURN
2140 IF INKEY$<>"L" OR INKEY$<>"
R" OR INKEY$<>"U" OR INKEY$<>"D"
THEN GOTO 2060
2150 PRINT AT 21,0;"JAMMED, TRY
ELSEWHERE.          "
2160 IF INKEY$="5" OR INKEY$="6"
OR INKEY$="7" OR INKEY$="8" THE
N PRINT AT D,A;" "
2170 IF INKEY$="5" OR INKEY$="6"
OR INKEY$="7" OR INKEY$="8" THE
N RETURN
2180 IF INKEY$<>"5" OR INKEY$<>"
6" OR INKEY$<>"7" OR INKEY$<>"8"
THEN GOTO 2160
2190 PRINT AT 21,0;"FIRE BEHIND
HERE TRY ELSEWHERE. "
2200 GOTO 2160
4000 FOR X=0 TO 25
4010 PRINT AT 21,0;"FLOOR HAS CO
LLAPSED.          ";AT D,A;"*"
;AT D,A;"(9a)"
4020 NEXT X
4030 LET FL=FL-1
4040 IF FL=-1 THEN PRINT AT 21,0
;"I AM AFRAID YOU HAVE PERISHED.
  "
4050 FOR X=0 TO 25
4060 NEXT X
4070 IF FL=-1 THEN GOTO 640
4080 GOTO 5
5000 REM instructions
5010 PRINT AT 3,7;"**************
****";AT 4,7;"*                *"
;AT 5,7;"* F I R E M A N *";AT 6
,7;"*                *";AT 7,7;"*
****************"
5020 PRINT AT 21,0;"PRESS ANY KE
Y TO CONTINUE.          "
5030 IF INKEY$="" THEN GOTO 5030
5040 CLS
5050 PRINT "YOU ARE A FIREMAN TR
APPED IN A  TALL BUILDING. YOU A
RE ON THE   FIRST FLOOR. IF YOU
GO DOWN YOU CANNOT GET OUT. THE
ONLY ESCAPE IS TO GO TO THE ROOF
 WHERE YOU  CAN CROSS TO THE NEX
T BUILDING."
5060 PRINT
5070 PRINT "IF YOU TOUCH ANY WAL
LS YOU WILL DIE INSTANTLY. IF YO
U FIND IT   DIFFICULT TO GET THR
OUGH THERE  MAY BE HELP AVAILABL
E."
5080 PRINT
5090 PRINT "FORTUNATELY YOU HAVE
 AN ASBESTOSSUIT ON, SO YOU CAN
WALK THROUGHTHE FIRE. THE FIRE M
AY EVEN BURNA WAY THROUGH,OR IT
MAY HINDER  YOU."
5100 PRINT
5110 PRINT "GOOD LUCK."
5120 PRINT AT 21,0;"PRESS ANY KE
Y TO CONTINUE.          "
5130 IF INKEY$="" THEN GOTO 5130
5140 RETURN
6000 SAVE "FIREMAn"
6010 RUN
```



POLYGON

POLYGON, written for the 1K ZX-81 by G Hitchmough of Liverpool, will draw regular polygons of up to eight sides, in random order, and you are asked to name them. If you answer correctly your score will increase. If the correct answer will be printed and the program will end.

```
   1 FAST
   2 LET S=PI-PI
   3 LET A$="TRIANGLE SQUARE  PEN
TAGONHEXAGON HEPTAGONOCTAGON "
  10 LET X=CODE "?"
  15 LET I=SGN PI
  20 LET Y=I+I
  40 LET N=VAL "INT (RND*6+3)"
  45 CLS
  50 PRINT "NO SIDES:";N;" SCORE
:";S
  60 LET A=Y*PI/N
  70 FOR B=I TO N
  80 LET P=COS (A*B)
  90 LET Q=SIN (A*B)
 100 FOR C=1 TO CODE "("-N
 110 LET X=X+P
 120 LET Y=Y+Q
 130 PLOT X,Y
 140 NEXT C
 150 NEXT B
 170 INPUT B$
 180 LET A$=A$(N*CODE "(9a)"-23
TO N*CODE "(9a)"-16)
 182 IF A$(LEN A$)<>" " THEN GOT
O CODE "(19)"
 183 LET A$=A$( TO LEN A$-I)
 184 GOTO CODE "(19)"
 190 IF B$=A$ THEN GOTO CODE ")="
 200 PRINT AT I,I-I;"WRONG IT IS
NOT A ";B$,"BUT A ";A$
 210 STOP
 220 LET S=S+I
 230 GOTO PI
```



RUNNER



STEER your **Runner** round the board with the usual cursor keys, avoiding the ghosts which are determined to steal your power. They will always move towards you but cannot move through the purple blocking squares. Run through the energy squares to gain power but do not lead the ghosts through them or they will eat them.

You gain 100 points for running through an energy square, lose one pont for each move, lose 50 points for running through a purple square, and gain bonus points for progressing to a new board. A new board can be reached by moving into the top left-hand corner.

The program was written for the 16K Spectrum by A Wilkinson of Chingford, London. All underlined letters should be entered in graphics mode.

```
  1 LET k=0
  2 LET p=100
  3 LET g=0
  4 GO TO 4000
  5 DIM a(4): DIM b(4)
  6 GO SUB 3000
  7 GO SUB 1000
  9 LET s$="B"
 10 FOR i=1 TO 4: LET a(i)=INT
(RND*21): LET b(i)=INT (RND*22):
 NEXT i
 20 LET x=21: LET y=31
100 FOR t=1 TO 2: FOR i=1 TO 4
110 PRINT AT a(i),b(i);" "
120 LET a=a(i)+SGN (x-a(i))
130 LET b=b(i)+SGN (y-b(i))
140 IF ATTR (a,b)=24 THEN GO TO
190
145 IF a=x AND b=y THEN GO TO 8
00
150 LET a(i)=a: LET b(i)=b
160 BEEP .01,25

190 PRINT AT a(i),b(i);CHR$ (14
9+t)
195 PRINT AT x,y;" "
200 IF INKEY$="5" THEN LET y=y-.
1: LET s$="B"
210 IF INKEY$="6" THEN LET x=x+
1: LET s$="D"
220 IF INKEY$="7" THEN LET x=x-
1: LET s$="E"
230 IF INKEY$="8" THEN LET y=y+
1: LET s$="C"
240 IF x<0 THEN LET x=0
250 IF x>21 THEN LET x=21
260 IF y<0 THEN LET y=0
270 IF y>31 THEN LET y=31
280 IF ATTR (x,y)=24 THEN PRINT
AT x,y; PAPER 2;"F": LET P=P-50
: BEEP .1,-10
290 LET P=P-1
291 IF P<1 THEN GO TO 900

295 IF ATTR (x,y)=48 THEN PRINT
AT x,y;"*": BEEP .05,20: LET P=
P+100
298 IF x=0 AND y=0 THEN GO TO 2
000
299 BEEP .01,RND*20
300 PRINT AT x,y; INK 1;s$
310 PRINT AT 0,0; PAPER 5;P; PA
PER 3;"AAA"
400 NEXT i
405 NEXT t
410 GO TO 100
800 PRINT AT 8,10;" BAD LUCK "
801 PRINT AT x,y; PAPER 4;"G"
805 BEEP .3,-10
810 PRINT AT 10,8;"You Were Cho
mPed "
820 PRINT AT 12,4;"You Got thro
ugh ";g;" Boards"
830 PRINT AT 14,10;"BONUS POINT
S=";INT (g^1.5*100);AT 16,10;"TO
TAL=";INT (g^1.5*100)+P

850 GO TO 2010
900 PRINT AT 10,1;" You've Run
Out of Puff ! "
910 GO TO 820
1000 PAPER 7: CLS : IF k=0 THEN
GO TO 1060
1005 FOR i=0 TO 21: FOR J=0 TO 3
1
1010 IF RND<k THEN PRINT AT i,J;
 PAPER 3;"A": BEEP .01,20
1040 NEXT J: NEXT i
1060 BORDER 3
1100 FOR i=1 TO 20
1110 PRINT PAPER 6;AT INT (RND*2
1),INT (RND*31);"I"
1120 NEXT i
1130 RETURN
2000 PRINT AT 10,5;" Well Done S
o Far "
2002 PAUSE 100: LET g=g+1
2005 FOR i=1 TO 20: BEEP .01,i:
NEXT i

2006>LET k=k+.05: GO TO 7
2010 PRINT AT 21,0; PAPER 6;" AN
OTHER GO ?  Y/N "
2020 IF INKEY$="y" THEN RUN
2030 IF INKEY$="n" THEN STOP
2040 GO TO 2020
3000 PAPER 7: BORDER 5: CLS
3010 PRINT AT 2,10;"WELCOME";AT
4,1;"Your Man (BCDE) Can Be Stee
red  With The Arrow Keys";AT 6,2
;" You Can Collect Points";AT 7,
2;"By Pickin9 UP Ener9y From I";
AT 8,2;"S9uares"
3020 PRINT AT 10,2;"Look Out For
 The G's";AT 11,2;"Which Eat You
";AT 12,2;"And The 'A' Squares..
..";AT 13,2;"(you lose 50 Points
 if you              smash one)"
3021>PRINT AT 15,2;"When You Wan
t To Finish, Run      Into The To
p Left Hand Corner Of The Screen
"
3025 PRINT : PRINT " Press Any K
ey To Start"
3030 IF INKEY$="" THEN GO TO 303
0
3040 RETURN
4000 RESTORE : FOR i=0 TO 71
4020 READ a: POKE USR "a"+i,a
4030 NEXT i
4040 GO TO 5
4050 DATA 255,129,129,129,129,12
9,129,255,0,16,24,56,24,20,18,0
4060 DATA 0,8,24,28,24,40,72,0,0
,8,28,28,56,20,20,4
4070 DATA 16,56,60,24,56,40,40,3
2,74,32,133,0,65,16,69,138
4080 DATA 24,126,90,126,36,60,90
,165,24,126,90,126,60,36,90,90,1
70,1,188,17,136,61,128,85
```



Take a giant step closer to reality with New Generation Software. The 3D Graphics of New Generation programs bring the screen alive and makes other games look as flat as snakes and ladders.

Spectrum owners will find that seeing is believing when they open the door on 'THE CORRIDORS OF GENON', the latest creation from New Generation. You will be saving the Universe from the evil that now controls all things. But beware – the sound of footsteps approaching could be Bogul!

Hurtle into a void leaving a trail for your unseen pursuers in 'KNOT IN 3D'. Weave your way through up to five trails but be careful, you could get knotted! Or travel through the depths of a moving tunnel full of bats, rats, spiders and toads in '3D TUNNEL', with a special surprise in the 48 K version.

Stamina is the vital ingredient of 'ESCAPE', as you'll be venturing into the maze pursued by walking and flying dinosaurs.

ZX81 owners must be prepared for the shock of coming face to face with the T. Rex that leaps out from '3D MONSTER MAZE'. '3D DEFENDER' takes you out of this world and plunges you into space in a fast moving game to defend your home planet against alien spacecraft in a blitz of explosions, plasma blasts and photon beams.

All these exciting 3D games have been designed by Malcolm Evans, the 3D expert. They'll have you leaping out of your seat because you don't just play New Generation games, you live them.

Corridors of Genon for 48K Spectrum £5.95
Knot in 3D for 48K Spectrum £5.95
'The most outstanding thing you'll see for a long time' Popular Computing Weekly
3D Tunnel for 16K/48K Spectrum £5.95
'A masterpiece of programming' Computer and Video Games

Escape for 16K Spectrum £4.95
'One of the best and most original games we have seen for the Spectrum' Sinclair User
3D Monster Maze for 16K ZX81 £4.95
'Brilliant, Brilliant, Brilliant . . .' Popular Computing Weekly
3D Defender for 16K ZX81 £4.95
'Another 3D Winner' Sinclair User

New Generation Software

Available from **W H Smith, Boots, Menzies, Spectrum Group** and all leading computer stores.

FREEPOST Bath BA2 4TD Tel 0225-316924
Mail order by return

FOOTBALL POOLS PROGRAM

- The program lists out, in order of preference, the sixteen most likely score-draws: also the sixteen most likely homes, draws and aways.
- It picks out the results on the bookmakers' FIXED ODDS coupons that have been given over-generous odds. Calculates your expected profit!
- The program will be initialised to the English and Scottish league tables. You will be able to update these league tables week by week as results come in — or enter a complete new set of league tables in other words, the program will never become "out of date"!
- All programs are recorded on a top quality cassette (usually Sony) and are accompanied with an instruction leaflet giving a brief explanation of the theory.

Available for the ZX-81 16K (Price **£8.95**) and the ZX Spectrum 48K (Price **£9.95**) from:

HARTLAND SOFTWARE
(Dept. S), 8 Penzance Place,
London W11 4PA.

FRENCH
AND NOW
GERMAN
VOCABULARY TEST

Improve your vocabulary & spelling.

The program is fun and easy to use and tests for both gender and accents.

Side a: Nouns

Side b: Verbs, Adverbs, Adjectives etc.

150 foreign words on each side.

A sophisticated program that makes extensive use of Spectrums sound and graphics facilities.

French Vocabulary Test available in 16K and 48K versions (please state which).

German Vocabulary Test—48K version only.

All programs £4.95.

Cheques or P.O.'s to:

TUTORIAL SOFTWARE,
P.O. BOX 43,
ENQUIRY OFFICE,
22-29 MILL STREET,
NEWPORT, GWENT NPT 3XZ

+ + +

OMNICALC (48K Spectrum)
The best Spectrum spreadsheet you can buy. Written in machine code to be faster, to give you more space for data, and to allow more features to be included, it is guaranteed uncrashable.

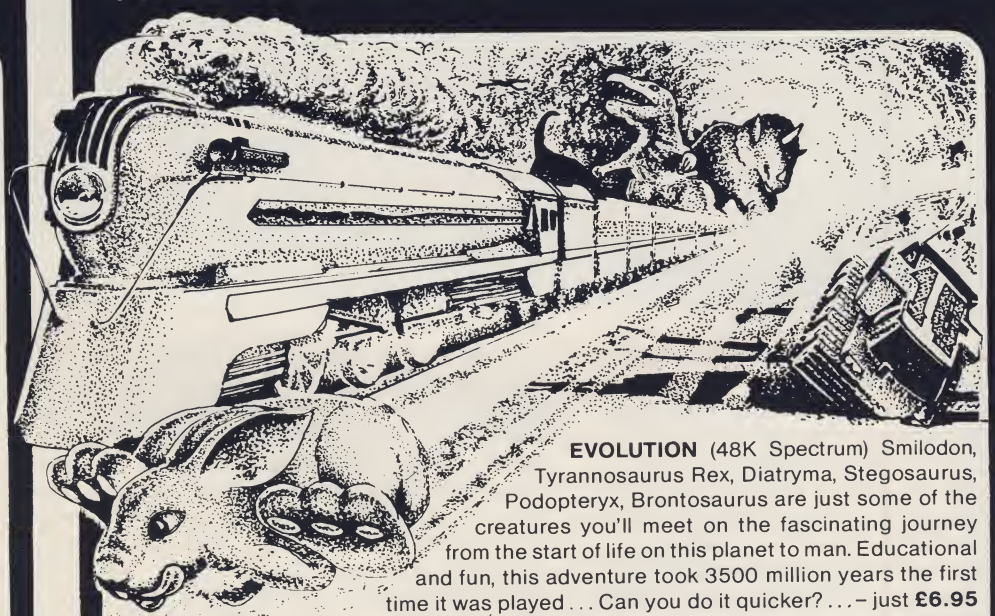
★ 99 columns or 250 rows.
★ Fully prompted input.
★ Extensive repeat facilities.
★ Supports ALL Spectrum functions.
★ Unique iterative facility.
★ Totals/Sub-totals.
+ many more.

"If more programs shared the quality of OMNICALC then we might see more Spectrums in offices"
Home Computing Weekly 3/6/83

"It is ideal for someone who has just found the spreadsheet concept, but it is also a very powerful tool for anyone who has used one previously"
Sinclair User June 1983

Complete with comprehensive manual. **£9.95.**

MICROSPHERE 72 ROSEBERY ROAD · LONDON N10 2LA
TELEPHONE 01-883 9411



EVOLUTION (48K Spectrum) Smilodon, Tyrannosaurus Rex, Diatryma, Stegosaurus, Podopteryx, Brontosaurus are just some of the creatures you'll meet on the fascinating journey from the start of life on this planet to man. Educational and fun, this adventure took 3500 million years the first time it was played . . . Can you do it quicker? . . . – just **£6.95**

CREVASSE / HOTFOOT (Any Spectrum) Can you make it across the ice-cap whilst chasms open and close all around you . . . or help a hungry rabbit in a hostile world . . . *"Simply Wonderful"* Sinclair User June 1983 . . . 2 original games on one cassette – only **£4.95**

THE TRAIN GAME (Any Spectrum) The game that starts where model railways left off. Full graphics featuring passenger, goods & express trains; tunnels; stations; turntable bonus games; irate passengers; collisions; derailments; and everything else you expect from a major railway! – Superb value **£5.95**

HEART RATE MONITOR

FOR ZX-81 and SPECTRUM

SAFE — RELIABLE — EASY
USE YOUR COMPUTER FOR HEALTH AND FITNESS

Convenient to use. Continuously monitors your pulse and displays digital heart rate on the screen. Plug in heart rate monitor suits Spectrum and ZX-81. Detects your pulse from finger or thumb placed over the sensor unit. The sensor unit is linked to the heart rate interface by 3 metres of cable. Includes an extender card — allowing use of printer, RAM pack etc. Takes power from the computer — avoids the use of batteries.

PRACTICE RELAXATION
Concentrate on reducing the displayed pulse rate. Your progress can be recorded and displayed as a 'rate of fall' which you can use as a personal performance record.

MONITOR FITNESS
Check your heart rate before and after a set exercise. Monitor how quickly it returns to normal. Your fitness level can be assessed by this method and used as a yardstick for future comparisons. Whatever form of exercise you take its effect on the pulse rate can be a significant indicator of fitness.

Simple basic programs can be used to produce graphs of heart rate versus time. Linked to your ZX-81 or Spectrum computer the signal can be used in your own simple basic programs to give continuous heart rate displays, bar charts, graphs etc. Compatible with all levels of program from simple basic routines upwards. Spectrum users can incorporate beep commands to give 'ECG' type sounds.
Does not interfere with the use of a printer — so you can down load your performance curves for comparison.

SUPPLIED READY BUILT — includes plug in Haart Rate Monitor interface with extander card, sensor unit and linking cable, software and instructions, READY TO USE £29.98. ORDER AS: HEART RATE MONITOR (HRM SU). STATE ZX-81 or SPECTRUM. £29.98.

ZX SPECTRUM AMPLIFIER	ZX SPECTRUM SUPER AMPLIFIER
250mW output. Volume control. Internal speaker. Very simply connected using load/save lead. Puts real power even into the simplest. "Beep" commands. Adds a real "zing" to musical programs and games. Requires PP3 battery — not supplied. Very low current drain. Supplied ready built complete with demo software and instructions.	250mW output. Now add synthesizer quality to those "Beep" commands. Super circuit with adjustable ATTACK, SUSTAIN and DECAY envelope controls. Plus variable ECHO. Generates a wide range of special effects. Five graduated controls. Internal speakers. Very smart case. Requires batteries — not supplied. Very low current drain. Ready built complete with demo software and instructions.
ORDER AS: ZX SPECTRUM AMPLIFIER (SA SU) £6.98	**ORDER AS: ZX SPECTRUM SUPER AMPLIFIER (SAA SU) £17.98**

MAGENTA ELECTRONICS LTD, Dept SU2. 135 Hunter Street, Burton-on-Trent, Staffs DE14 2ST. (0283) 65435. Prices include VAT, add 50p p&p. Cash with order. Access/Visa by phone or post.

NEW ★★★ NEW ★★★ NEW ★★★ NEW

DK'TRONICS UP TO QUICKSILVA
BUGBYTE 25% MICROGEN
PSS OFF R&R
ARTIC QUEST
MICROSPHERE MELBOURNE

SAVE POUNDS and get Spectrum software from RAINBOW. We review the latest the most popular and the best software we can find. Not only that, EVERY TITLE in our comprehensive monthly guide has AT LEAST 10% OFF, with several top titles at up to 25% OFF! There are also books and hardware, all at a discount and all guaranteed.
For FREE MEMBERSHIP to Rainbow choose one (or more) titles from the selection below and post this advert now with your cheque or P.O. Simply agree to choose another three titles in your first six months membership and we will send you MONEYSAVER REVIEW & GUIDE, EVERY MONTH FREE, with dozens of money-off titles to choose from.

☐ BLACK HOLE 16K	(5.50)	ONLY	4.25	☐ DICTATOR 48K	(4.95)	ONLY	4.35
☐ VIOLENT UNIVERSE 16K	(5.50)	ONLY	4.25	☐ VELNORS LAIR 48K	(6.95)	ONLY	6.25
☐ LIGHT CYCLE 16K	(5.95)	ONLY	4.50	☐ SMUGGLERS COVE 48K	(6.95)	ONLY	6.25
☐ 3D-COMBAT ZONE 48K	(5.95)	ONLY	4.95	☐ TRADE TRILOGY 48K	(9.95)	ONLY	8.95
☐ COSMIC DEBRIS 48K	(4.95)	ONLY	4.35	☐ HOBBIT 48K	(14.95)	ONLY	12.95
☐ GALAXIANS 48K	(4.95)	ONLY	4.35	☐ MAD MARTHA 48K	(6.95)	ONLY	5.95
☐ AH DIDDUMS 48K	(5.50)	ONLY	4.50	☐ EVOLUTION 48K	(6.95)	ONLY	5.95
☐ ARCADIA 48K	(5.50)	ONLY	4.50	☐ 4D-TERROR DAKTIL 48K	(6.95)	ONLY	5.95
☐ MANIC MINER 48K	(5.95)	ONLY	5.25	☐ XADOM-3D 48K	(6.95)	ONLY	6.25
☐ TRAIN GAME 16/48K	(5.95)	ONLY	5.25	☐ PENETRATOR 48K	(6.95)	ONLY	5.95

POST BEFORE 21st NOVEMBER — DOZENS MORE TITLES IN NEXT REVIEW & GUIDE.

☐ Please send me the titles ticked above. I agree to choose three more titles in my first six months membership and enclose a cheque/P.O. for £..... + 50p p&p (guardian sign if under 18).

☐ Next MONEYSAVER REVIEW AND GUIDE only (FREE TO MEMBERS) I enclose 50p.

NAME.....

ADDRESS

.....

To RAINBOW SYSTEMS LTD, FREEPOST PO BOX 42, HARROGATE HG2 9BR
(Registered office: 28 Market Street, Wigan)

Professional Software for Spectrum and ZX81



SPECTRUM 48K

■ **Payroll:** Weekly, monthly, hourly. All tax codes, and pay levels. Guaranteed correct. £25.00 ■ **Statutory Sick Pay:** Better than programs costing 10 times as much on other machines. £40.25 ■ **Stock Control:** Over 1500 lines. Find, add, delete, in 2 seconds! Sinclair or full-width plain paper printer (with interface) supported. £25.00 ■ **Spectrum Demo Tape:** Demonstration versions of payroll, stock control, SSP. On one tape. £3.95 ■ **Critical Path Analysis:** Enter network of over 500 activities. Program finds critical path. Durations and costs can be modified, and the calculation repeated. Full-width printer supported. £15.00

SPECTRUM 16K (usable on 48K)

■ **Mortgage:** See how repayment amount affects duration and total amount paid. While paying: see how much interest and how much capital you are paying. Month-by-month table printed. On the same tape ■ **Loan:** Calculates true interest when paying instalments etc. £8.00 (both programs together)

Parallel Printer Interfaces:

■ **The Standard Interface:** Centronics interface to link your ZX Spectrum to many popular dot matrix and daisywheel printers. The package includes: interface, simple word processor, 3 sets (different) of printer software, cable, centronics plug, full instructions. The **LLIST** and **LPRINT** commands are supported. Many other features also. £45 inc. VAT. Post free. ■ **The Deluxe Interface:** Includes all the features of the standard package, and also has a 3.5 mm jack socket and special circuitry which allows the ZX Spectrum to **Save** and **Load,** without having to unplug or switch anything! £55 inc. VAT. Post Free. ■ **The Professional Interface:** Includes all the features of the deluxe package, but also allows the ZX Spectrum to be used as a very powerful peripheral processor for a bigger computer! Software is supplied which post-processes word processor output with straight right and left margins. £99 inc. VAT. Post Free.

Tape Loading Problems With Your Computer?

■ **Loading Aid:** Allows you to get tape playback level right first time. Helps with dropouts and to check tape quality too! Standard model £5.95, De luxe model £7.95 ■ **The Microcomputer User's Book of Tape Recording:** Is a practical guide to help you get programs in and out of your computer. Written for the computer user – but several audio and computer professionals have found it useful! ISBN 0 946476 00 4. ONLY £3.15 incl. postage (£2.90 in shops – temporarily out of stock) ■ **Test and Alignment Cassette:** Tape loading problems are often due to a mis-aligned tape head. Align your tape head by ear with our tape – no instruments required! £4.90

ZX81 16K

■ **Beamscan:** Computers bending moment and shear force diagrams for a simply supported beam with 1-99 point, uniform and uniformly tapered loads. £25.00 ■ **Time Ledger:** For up to 17 employees, 200 clients. £15.00 ■ **Optimax:** A powerful linear optimisation program up to 75 variables · . . constraints. £40.00 ■ **Payroll:** As above but only up to 30 employees. £25.00 ■ **Stock Control:** As above but 400 stock lines in 16K or 2000 lines in 64K. £25.00 ■ **Critical Path Analysis:** Up to 500 activities in 16K. Over 500 activities in 48K. £15.00 ■ **Budget:** Keeps track of expenses and compares with budget. 50 headings plus 12 months or 12 categories. £15.00 ■ **Financial Pack:** Contains three programs: Mortgage, Loan and VAT £8.00

All items are post free and include VAT. Programs are supplied with comprehensive manuals.

Remember We at Hilderbay pride ourselves in the development of high quality professional software that is fully functional and with full support.

Contact us now for further information on these products and our full range of Apple II Software.

TRADE ENQUIRIES WELCOME ON ALL PRODUCTS

Hilderbay
Professional Software

Hilderbay Ltd Dept. 8-10 Parkway Regents Park London NW1 7AA
Telephone: 01-485 1059 Telex: 22870

SPOT THE DIFFERENCE!

Choosing which game to buy from the mountain available is a difficult job, especially when everyone claims to produce the best on the market. But how can you tell the best from the rest?. To help you decide, read on. . . .



THE DUNGEON MASTER

Let your Spectrum be your guide in a totally new dimension in adventures in the true spirit of traditional role playing games where YOU design the scenario.

"I have been a Dungeons and Dragons fan for several years....The package provides excellent entertainment for all fans of the cults and should prove a good introduction to the game".
....Sinclair User.

"Highly recommended for its versality, originality and quality. Definately well worth obtaining".
....ZX Computing.

ZX Spectrum 48K **£7.50**

Written by Graham Stafford.

What the real critics say. . . .

Very rarely have software titles produced such universal acclaim as 'Halls of the Things' and 'The Dungeon Master'. Now, with three brand new programs, Crystal continues to set the standard of software excellence. The difference is obvious - the choice is yours:

The Best or The Rest.



HALLS OF THE THINGS

A stunning multi-level maze 'arcade - adventure'.

"Excellent and dangerously addictive - could change the Spectrum games scene overnight". Sinclair User.

"Spectacular - One of the best games I've seen, finely balanced between simplicity and addictiveness - superb graphics and colour - I CAN'T RECOMMEND IT HIGHLY ENOUGH". Popular Computing Weekly.

ZX Spectrum 48K **£7.50**

Written by Neil Mottershead, Simon Brattel and Martin Horsley.



THE ISLAND

The ultimate test of logic and deduction! Can you solve the hidden mysteries of the South Pacific Island on which you have been stranded - and escape alive! A brilliant classic style adventure game to facinate and frustrate you for months!

ZX Spectrum 48K **£7.50**

Written by Martin H. Smith.



INVASION OF THE BODY SNATCHAS!

At last! a version as fast and furious and as frustratingly addictive as the arcade original. Landers, Mutants, Bombers, Pods, Swarmers and much much more combine to produce the ultimate space game!

ZX Spectrum 48K **£6.50**

Written by Simon Brattel and Neil Mottershead.



ROMMEL'S REVENGE

A brilliant interpretation of the most visually stunning arcade game of all time. Superb high resolution 3D graphics with full perspective plus a host of new and exciting features make Rommel's Revenge the most spectacular game ever produced for your Spectrum!

ZX Spectrum 48K **£6.50**

Written by Martin Horsley.



Please send SAE for our latest catalogue and details of our forthcoming software.
Catalogue FREE with every order. P&P included.
Please add £0.50 per item for overseas orders.

Please make cheques/PO's payable to:

CRYSTAL COMPUTING
Dept SU11
2 ASHTON WAY
EAST HERRINGTON
SUNDERLAND SR3 3RX

Please Supply:

Invasion of the Body Snatchas ☐
Rommel's Revenge ☐ The Island ☐
Halls of the Things ☐ The Dungeon Master ☐
Catalogue (please enclose SAE 6in. x 9in.) ☐

I enclose cheque/PO for.....

NAME.....

ADDRESS.....

DEALERS! For details of our excellent dealer discounts (including export) ring Chris Clarke on 061-205 6603.

PROGRAMMERS! Written any good software? send it to us for evaluation and details of our excellent royalty scheme.



MiCROL©

THE NAME ON THE WORLD'S FINEST SOFTWARE

What the experts say:

Sinclair User..."QUALITY"

•USE AND LEARN

Sinclair User..."EXCELLENT VALUE"
What Micro..."TREMENDOUSLY VALUABLE... GET THE BEST OUT OF SPECTRUM BASIC"
ZX Computing..."EXCELLENT...A GREAT ASSET...FANTASTIC VALUE...VERY HIGHLY RECOMMENDED"

•THE DATABASE

Sinclair User..."EXCELLENT VALUE"
MicroDecision..."OF ALL THE DATABASE-TYPE PROGRAMS AVAILABLE, MiCROL'S SEEMS THE BEST VALUE...MORE FOR YOUR MONEY"

•THE SPREADSHEET

Personal Computer News..."EASY TO USE...PLENTY OF USES...STREETS AHEAD" (OF GEMINI'S SPREADSHEET)
Sinclair User..."EXCELLENT VALUE...MUCH CLEARER" (THAN VU-CALC)
What Micro..."QUALITY"

BBC & SPECTRUM SPREADSHEETS Now with 45 Page "Spreadsheeting Course" Manual + 4 FREE Ready-to-use Models

THE DATABASE & THE SPREADSHEET Now Available With Special Features, for BBC 32K. Please 'phone or write for Information & Prices.

MiCROL©

Order TODAY for fast convenient delivery

THE THOUGHT PROCESSOR

MiCROL©

SERIOUS SPECTRUM SOFTWARE only £9.95 each!

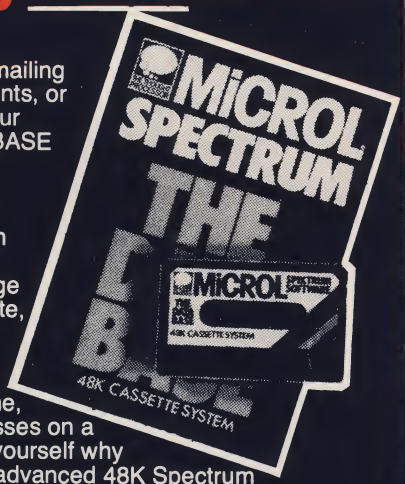
USE AND LEARN



Your perfect Spectrum starter Kit. 25 original BASIC programs you can use immediately, PLUS 118 page manual to help you get the most from your 16 or 48K Spectrum. 25 programs include: Music Composer, World Atlas, Computer Term Glossary, Screen Designer, Star Maps – PLUS games and powerful routines to use in your own programs: graph-drawing, text-editing, sorting, searching and much more. 118 page manual includes detailed description of programming techniques, full listings of all programs, and articles to develop your own program-writing skills.

"Excellent" A.R. West, Surrey. "First-time loading, user-friendly, superb documentation" J.E. Mann, Leeds.

THE DATABASE



Whether you want to update mailing lists, manage customer accounts, or simply produce an index of your record collection, THE DATABASE makes it easy and enjoyable. A breakthrough in power *and* practicality, THE DATABASE allows you to store information on any subject in the way *you* want, and gives you a full range of commands to display, update, sort, search and print – even perform calculations. Massive storage capacity: 1,000 lines in memory at a time, over 7,000 names and addresses on a single C90 cassette. See for yourself why THE DATABASE is the most advanced 48K Spectrum database available – far more powerful *and* practical than Sinclair's VU-FILE and all other "competitors".

THE SPREADSHEET



Based closely on Visicalc, the world's best-selling program, THE SPREADSHEET turns your 48K Spectrum into a "super-Calculator" that helps you solve all kinds of number-based problems quickly and easily. Hundreds of applications in business, engineering and science – and just as versatile for home finance management. Invaluable in education too, helping develop maths ability and confidence. In power, flexibility and ease of use, THE SPREADSHEET outperforms all other Spectrum spreadsheets – including Sinclair's VU-CALC. See for yourself, with the security of MiCROL'S 14 day money-back Guarantee.

THE WORD PROCESSOR



The only full feature, professionally-written word processor for 48K Spectrums. Use it to produce memos, letters, reports – THE WORD PROCESSOR has the features you need, including flexible editing, justification, centering, and automatic "word wrap". Simplicity itself to use, THE WORD PROCESSOR uses the same "what you see is what you get" principle as word processors costing hundreds of pounds more. 30,000 character storage capability for real-work applications, and it's easily adapted to work with full size printers. Once again, MiCROL sets the standard in serious Spectrum software.

To order: (UK Orders Only).
Simply complete the coupon, and FREEPOST with your cheque, made payable to MiCROL (UK Mail Order).
All products normally available from stock and despatched by return.
Credit Card Orders: By phone 9-5.30 Mon to Fri. stating name and address, Card No. and item(s) required.

MiCROL©

38 Burleigh Street, Cambridge CB1 1BR.

(0223)312453

Post to:– MiCROL (UK Mail Order) Freepost SU11
38 Burleigh Street, Cambridge CB1 1BR

Please send me.....copy/copies of USE AND LEARN
Please send me.....copy/copies of THE DATABASE
Please send me.....copy/copies of THE SPREADSHEET
Please send me.....copy/copies of THE WORD PROCESSOR

I enclose cheque/P.O. for.....(£9.95 + 50p p+p – £10.45 total each)

Or I wish to pay by Access/Barclaycard/Visa
Card Number
Please print name and address

Name

Address.....

.....

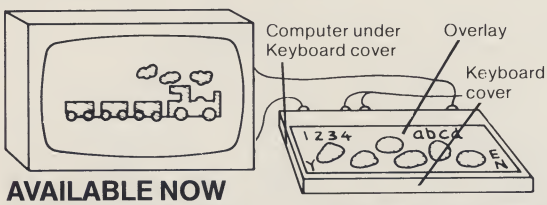
.....

Credit Card holder's signature

Early Learning Opportunities
Educational Software
26, Cleeve Lodge Road, Downend, Bristol BS16 6AG

AT LAST!!

Educational programs for young children written for the 48K ZX SPECTRUM by people involved in the education of young children and children with learning difficulties. The programs do not depend upon children's ability to cope with the complex computer keyboard, but are supplied with keyboard overlays which fit onto a keyboard cover. Children cannot see the keys and can concentrate solely upon those symbols which are used in each program.



AVAILABLE NOW

★ PRESS AND MATCH

Introducing the relationship between keyboard and TV screen and going on to help children in their understanding of number groups to five. Pictures of simple objects and moving trains are used in this program.

★ ANIMAL CRACKERS

Again helping children in their acquisition of number concepts to five, this program requires children to 'feed' animals by their correct response to the TV picture. This program uses both number groups and symbols.

TOTAL PACKAGE PRICE £9.95

(Supplied for the 16K ZX SPECTRUM on request) *Please send cheque/PO with order

ATTACK ON NEW YORK

ZX Spectrum 16K or 48K



You are alone in Central Park; your mission is to save Manhattan.

Lots of features ★ bonus lives ★ hi-score ★ amazing graphics.

This high quality cassette is **NOT** protected and **CAN** therefore be LISTed.

This allows those who wish, to observe exactly how the program runs, and/or experiment with line alterations.

Send £4.25, to: FRY
174 Heythorp Street, London, SW18.
STATE WHETHER 16K or 48K

campbell systems

★ put your Spectrum to work ★

SEE US AT THE 8th ZX SHOW ALEXANDRA PALACE, SATURDAY AUGUST 20th

MASTERFILE

"The most comprehensive of the data-bases...."
Sinclair User June 1983

Design features
- ★ menu driven
- ★ fully machine coded
- ★ dynamic variable length file— NO WASTED SPACE
- ★ update, erase, copy any record
- ★ you have up to 32K per file
- ★ open ended — ready for microdrive

Files
- ★ up to 26 ITEMS per record
- ★ up to 128 characters per ITEM
- ★ save and load FILE independently of the program
- ★ search FILE for numeric or character comparison — on multiple levels

Display
- ★ up to 36 different user-defined ways of viewing selected data
- ★ sequence by ITEM or chronologically
- ★ 1-21 RECORDS displayed at a time
- ★ pageing
- ★ printing
- ★ scrolling
- ★ TOTAL / AVERAGE any ITEM
- ★ optional USER-BASIC for tailored processing

Now accepted as the definitive filing system for the 48K Spectrum £15.00

Masterfile-16 a subset for the 16K Spectrum £8.95

DLAN Display Language

FOR ZX SPECTRUM 16K/48K

a simple, powerful machine coded interpreter for generating dynamic textual display for use in advertising & education

THE HIT OF THE LAST MICROFAIR

- ★ DLAN commands are all single letter or symbol
- ★ define any window on the screen and recall as often as you like
- ★ print any text you like in any combination of 11 fonts, specially designed by Image Systems in a range of styles and sizes, some with proportional spaced letters
- ★ scroll your text any which way you choose within the window — or the whole screen if you wish
- ★ largest font size 3x2
- ★ word processing keeps left hand margin clean
- ★ BRIGHT, DULL, FLASH, STEADY
- ★ GOSUB equivalent
- ★ screen timing commands
- ★ 48K DLAN gives you 26K of space in which to place your display commands — 16K DLAN gives you 2K
- ★ 8-page manual

★★★★★ SPECIAL INTRODUCTORY OFFER £7.95

THE FAST ONE 16-64K ZX81

"One of the best data-management systems available for the ZX81."
Sinclair User June 1983 £12.00

GULPMAN Spectrum 16/48K £4.95

GULP 2 ZX81 16K £4.75

All programs mailed 1st class by return. Prices include VAT and postage within Europe. SAE for full list.

Send your order with a cheque or postal order to Campbell Systems (Dept. S2)
15 Rous Road, Buckhurst Hill, Essex IG9 6BL England Telephone 01 504 0589

CS

AT LONG LAST...

Adult Video & COMPUTER Games!

available now.

ATARI 2600.

201 Cathouse Blues.– Philly Flasher
202 Burning Desire.– Bachelorette Party
203 Knight on the Town.– Jungle Fever
204 Beat 'em and Eat 'em.– Lady in Wading
205 Bachelor Part .– Gigolo
206 Westward Ho.– General Re-treat

WORLD'S FIRST 2 in 1 Playaround adult video games TWICE THE SPICE

*** 6 cartridges – 12 games available now**
*** Fits Atari, Sears, Video Arcade and Colecovision (with adapter).**

ZX Spectrum.

CASSETTE ONLY 16 or 48K.

101. SOHO Adventure. AND SEX Invaders.
102. Cathouse Blues. AND Philly Flasher.
103. Gigolo. AND Beat em & Eat 'em.



General Retreat
Another stimulating game of love and chance where you send your 'soldier of fortune' across tricky terrain to make love to a lively princess. Your soldier will lose a turn (in more ways than one) if he is struck by a cannonball or assaulted by a prickly cactus but if he makes it, the graphics and sound effects will indicate the fact. (On a double tape with 'Westward Ho').

2 games in 1 – a game for him and a game for her

TRS 80./GENIE

CASSETTE 16k DISK 48k

301. SOHO Adventure. AND SEX Hunt.



BBC. mod 'B'

CASSETTE ONLY

401. FLASHER. AND "FATE" (worse than death) Adventure.

PLEASE SUPPLY _____

POST & PACKING. £ _____

I Enclose CHEQUE/P.O. for £ _____
Payable to S.F.C. Ltd.

NAME _____

ADDRESS _____

POST CODE _____

VISA OR Debit my Access/Barclaycard (Delete as necessary)

We welcome Access

Cassette. 7·99 – Disk. 9·99 – Cartridge. 29·50 – Postage. 90p. each

WRITE NOW – OR – TELEPHONE YOUR ORDER QUOTING Access/Visa No. (24hr Service)

Silver Fox COMMUNICATIONS Ltd.

P.O. BOX 16, CLACTON ON SEA, ESSEX. Tel: (0255) 422034

The UK's Only specialist 'ADULT' software distributor. TRADE ENQUIRIES WELCOME

WANTED New ADULT GAMES and Game Ideas.

School becomes Spectrumised

Nicole Segre meets Canterbury schoolmaster Colin Dickinson, who is infatuated with Sinclair computers

AT THE END of every term, the 50 or so boarders at St Edmund's Junior School, Canterbury, Kent, take home for their parents' benefit a detailed printed statement of how much they have spent on telephone calls, sweets from the tuckshop, replacement of school property, stationery, stamps and other sundries, and how much remains in their pocket-money accounts.

At any time during the term, a print-out showing vital facts like who is where on weekend leave, how many meals are needed, the pupils' behaviour record, their examination results and their latest air pistol shooting scores is available at scarcely any notice.

It is all done on a Spectrum owned by Colin Dickinson, the St Edmund's Junior School boarding housemaster and also its mathematics and science teacher. His enthusiasm for his machine has resulted not only in the gradual computerisation of the administration of the school but in the recent arrival of 10 more Spectrums for the amusement and instruction of the 200 pupils.

Dickinson's infatuation with computers began when he first set eyes on a ZX-80 belonging to a colleague. It was at about that time that the ZX-81 appeared and he bought one immediately, putting himself on the Spectrum mail order list not long afterwards.

"The Spectrum broke down two days after it arrived," he recalls, "but I drove to Cambridge and insisted that it was replaced. That was done without a murmur and I have never looked back since."

Dickinson had to overcome his ignorance of programming, as well as the difficulties of loading and saving on a ZX-81 to write his first program, the boarders' pocket money accounting system. "I burned a good deal of midnight oil," he says, "and looking at it now, I can see that the structure of the program is a hideous mess — but it works. I once tried to tidy it but the results were not so good, so I decided to leave it alone."

The program shows what each boy has spent and also produces a balance statement for the bursar, as well as transferring messages for the house tutor; standard amounts for everyone can be entered and all sums are calculated automatically.

Since the first program, Dickinson has written a program which produces general listings of pupils by name, age, form, house, or what have you. Another works-out their three-weekly work grades and another sorts examination results into either alphabetical or rank order. There is a program to issue exit slips for pupils leaving the school premises and one to calculate bills for children using the school telephone.

A particularly useful program keeps track of the school "stars and stripes" scheme, a merit and demerit system by which 10 stars earn a Mars bar and six stripes mean a week's fatigue duties.

Perhaps best of all is the program which keeps a record of air pistol shooting scores, along with the position of pupils on the competitive ladder and the average of their five best scores, all calculated automatically.

Dickinson does not think the time he saves by using the computer has compensated for the time he has spent programming it — yet. "It would be much quicker than pencil and paper, as well as more accurate, if it were not for the delay in loading and saving," he says. To remedy that, he has ordered a Microdrive, which will mean that he can have a program ready to run in a few seconds.

Dickinson's equipment consists of a Spectrum built into a dK'tronics keyboard — he is adept with a soldering iron — an Abacus controller amplifier, built-in power supplies, and a newly-acquired Dean Electronics Timex printer, which he feels is a great improvement on the Sinclair one "although that is marvellous at the price."

For the school, he has managed to acquire one Spectrum with colour monitor and tape recorder with the help of funds from the Department of Industry Microcomputers in Primary Schools scheme; and another nine Spectrums with black and white monitors bought by "a rich and eccentric friend of mine."

The children, including the girls who have been attending the school as day pupils since last year, can use the ma-





chines in their spare time for games. "The boys tend to like the arcade games best and the girls seem to prefer the adventure games. Either way, it is a useful way to keep them out of mischief," he says.

From this term they will also be learning about programming, in groups working two to a machine for an hour a week. "Once they have all taken the initial compulsory course, intended to give them just a taste of what programming is, those who do not like it can drop out but I am hoping some will want to continue seriously," Dickinson says.

He sees other advantages in having computers for the children to use. One, he admits unashamedly, is that parents are attracted to any school able to teach their offspring computer skills. "It looks great on a prospectus," he says gleefully. He also feels that the Spectrum has a particularly useful role to fulfil in the classroom.

"Computers will never replace teachers," he says, "but they can be used to plan and monitor a course which uses a variety of resources — including old-fashioned books.

They can also be used to make practice and drill, or simple learning by rote, more stimulating than traditional methods."

The educational software available, he says, is scarcely inspiring. "It tends to be either too simple — counting buttons or trains, for instance — or it is badly-designed and presented, so that the children do not know what they are meant to be doing."

He has written two educational programs — one a multiplication tables test, the other a French vocabulary test complete with accents.

'One program keeps a record of air pistol shooting scores along with the position of pupils on the competitive ladder and the average of their five best scores'

He thinks the real way forward is for teachers to make software designers aware of their problems and provide new programs according to their needs.

Many children find it much easier to work with a computer than to have an adult looking over their shoulders, he says, and those with special problems find it specially valuable.

However primitive the state of the art, the Spectrum has already proved its worth in the classroom. "The single-entry keyboard has been much-criticised," says Dickinson, "but the children love it — especially those with reading and writing problems.

How much simpler to press a button than to have to spell it." The Spectrum syntax checking, which does not permit an incorrect line to be entered, is also helpful.

"One dyslexic child has improved considerably by being able to practise on the computer; and a particularly shy, quiet child has gained general respect by his unusual skill on a keyboard."

Dickinson's enthusiasm shows no sign of waning and even appears to have rubbed off on the children. Two former pupils are now busily programming on the senior school's two RML 380-Z machines and the junior school computer room, with its array of Spectrums, is scarcely ever empty.

University Software

LIBRARY OF ADVANCED MATH/STAT/ECON

TAPE 1: MATRIX OPERATIONS — **SPECTRUM £6.95, ZX81 £5.95**

Side A: Inversion, multiplication, addition, subtraction and scalar multiplication of matrices and vectors within one single program. Any output can in turn be used as the input of the next operation without re-typing. Capacity: 16K ZX81: 25×25, 16K Spectrum: 17×17, 48K Spectrum: 48×48.
Side B: Determinants of square matrices.

TAPE 2: POLYNOMIALS — **SPECTRUM £6.95, ZX81 £5.95**

Side A: Includes quadratic equations (as degree 2 polynomials) and Newton-Raphson and half-interval search methods for higher degree polynomials. Computes the roots with 8 digits of precision.
Side B: You can plot polynomials in any interval and examine their roots, extremum points.

TAPE 3: INTEGRATION — **SPECTRUM £6.95, ZX81 £5.95**

Side A: Integration of functions by Simpson's and trapezoidal rules. Also computes the area enclosed by two functions.
Side B: Plot of integrals. Integration can be visualised on the screen.

TAPE 4: REGRESSION — **SPECTRUM £7.95, ZX81 £6.95**

Side A: A highly developed multivariate regression program featuring Log/Ln option on each variable (thus allowing exponential and geometric regressions), R^2, corrected R^2, standard errors, t-statistics, F-statistics, degrees of freedom, Durbin-Watson statistic, interpolation. Capacity (no of variables × no of observations); 16K ZX81: 2×500, 5×250, 10×140, 16K Spectrum: 2×220, 5×100, 10×50, 48K Spectrum: 2×1800, 5×900, 10×500.
Side B: Plot of bivariate regressions. You can see how your computer draws a best-fitting line on a set of numbered data points.

TAPE 5(a): LINEAR PROGRAMMING — **SPECTRUM £7.95, ZX81 £6.95**

Side A: A user friendly optimisation program capable of handling all sorts of linear programming problems (any combination of $<,=,>$, constraints and $x_i>$, $x_i<0$, $-\alpha<x_i<\alpha$ sign constraints). Features the cannonical equivalent of the primal, values of slack variables and the dual. Capacity (no of variables × no of constraints); 16K ZX81: 10×23, 15×20, 20×15, 16K Spectrum: 10×10, 48K Spectrum: 10×50, 25×40, 50×30.
Side B: Solutions of simultaneous equations.

TAPE 5(b): PROFESSIONAL LINEAR PROGRAMMING — **£14.95**

Available for 16K ZX81 and 48K Spectrum with above features plus 'save-data' and 'change-data' facilities. Any single data entry can be changed without re-typing the whole data.

- Cheques payable to:
 UNIVERSITY SOFTWARE
 29 St Peter's Street
 London N1 8J9
- All incl. prices for the UK.

Tapes 1 – 5(a) Spectrum £35
ZX81 £30

TELESOUND 84

(Patent Pending)

ZAP

SPECTRUM BEEP BOOSTER

. . . Puts Sound Through TV . . .

Probably the world's smallest sound modulator, measuring 2½ x 1½ x 1cm, TELESOUND 84 fits inside the ZX Spectrum and most other home computers to enable the BEEP to be heard directly from an unmodified TV. Sound can be controlled by the TV from a whisper to a roar. Fitting takes only minutes with three easy snap-on connections, eliminating soldering. Dealer enquiries welcome.

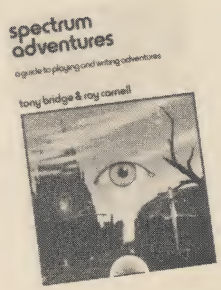
TELESOUND 84 costs £8.95 inclusive from Dept SU.

COMPUSOUND

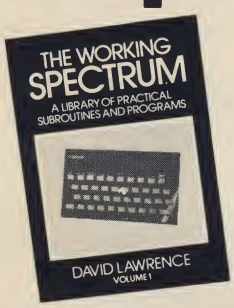
32 Langley Close, Redditch
Worcs B98 0ET

SUNSHINE

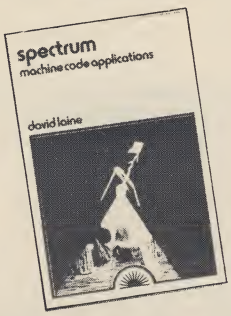
The best books for the Spectrum



Spectrum Adventures
A major work by Tony Bridge and Roy Carnell detailing the growth and development of Adventure Gaming.
ISBN: 0 946408 07 6



The Working Spectrum
A library of practical subroutines and programs by David Lawrence.
ISBN: 0 946408 00 9



Spectrum Machine Code Applications
David Laine explains a collection of practical machine code routines.
ISBN: 0 946408 17 3

Sunshine Spectrum Software

* Cruising — 16K RAM
* Blind Alley — 16K RAM
* Androids — 16K RAM
* Sword Fight — 16K RAM
* Galaxy Attack — 48K RAM

Look out for the Sunshine range in W.H. Smith's, Boots, John Menzies, other leading retail chains and through our national network of book shops and specialist stores.

Dealer enquiries:
01-734 3454.

Please send me

- ☐ The Working Spectrum at £5.95 each
- ☐ Spectrum Adventures at £5.95 each
- ☐ Spectrum Machine Code Applications at £6.95 each
- ☐ Cruising at £4.95 each
- ☐ Blind Alley at £4.95 each
- ☐ Androids at £5.95 each
- ☐ Swordfight at £5.95 each
- ☐ Galaxy Attack at £5.95 each

I enclose a cheque/postal order for £_____ made payable to Sunshine Books, 12/13 Little Newport St., London WC2R 3LD

Name _____

Address _____

Signature

We can normally deliver in 4/5 days.

Be Spoilt For Choice...



Why not be spoilt for choice this Christmas and avoid all the usual rush, hassle and frustration of present buying. By visiting the first Your Computer Christmas Fair (December 15-18) you can be sure of seeing a truly vast range of microcomputer products, all under one roof at the Wembley Conference Centre, the most modern and comfortable exhibition venue in the country.

Whether you're interested in choosing a micro for home management, child education or games playing, you can see everything demonstrated at the show, with all your questions answered by expert sales staff from the manufacturers, dealers and software houses. Huge amounts of software and hardware, add-ons like joysticks and printers, plus a special Sinclair Village, will be at the show.

There's never been a better way to shop for micro computer presents. So wrap up your Christmas gift worries at the Your Computer Christmas Fair.

Wembley Conference Centre December 15-18, 1983

Opening times are from 10 am to 6 pm every day except Friday – Special late night 8 pm closing.

Admission Price
£2·50 Adults £1·50 Children

Sponsored by **YOUR COMPUTER**

Organised by Reed Exhibitions Surrey House 1 Throwley Way Sutton Surrey SM1 4QQ Tel: 01 643-8040

TASWORD TWO THE WORD PROCESSOR

48K SPECTRUM

64 CHARACTERS PER LINE ON THE SCREEN AND TO PRINTERS!

TASWORD TWO The Word Processor

Your Spectrum becomes a **professional** word processor with TASWORD TWO. TASWORD TWO gives you an amazing **64 characters per line** on your screen. This is ideal for standard A4 paper and TASWORD TWO prints your text just as it appears on your screen.

Tasword Two drives the following interfaces:

Cobra RS232 I/O Port	*Kempston Interface*
Euroelectronics Interface	*Morex Interface*
Hilderbay Interface	*Tasman Interface*

The same program drives these interfaces. A short easy to follow set of instructions takes you through setting up your Tasword Two to drive the interface you have or choose to buy. Tasword Two also drives the ZX printer.

£13·90 fully inclusive mail order price.

TASWORD TWO TUTOR

TASWORD TWO comes complete with a manual and a cassette. The cassette contains your TASWORD TWO **and** TASWORD TWO TUTOR. This teaches you word processing using TASWORD TWO. Whether you have serious applications or simply want to learn about word processing, TASWORD TWO and TASWORD TWO TUTOR make it easy and enjoyable.

TASWORD TWO £2 Demonstration Cassette

See for yourself the powerful features of TASWORD TWO. Send just £2 for the Tasword Two demonstration cassette. A voucher is included which gives you £1 off the price of TASWORD TWO.

TASWIDE – 64 characters per line!

A machine code utility program, TASWIDE **doubles** the information that your own programs can display. Make a simple change to your print statements and your output appears on the screen at 64 characters per line instead of the normal 32. Both print sizes can be mixed on the screen. 16K and 48K versions supplied on the same cassette.

£5·50 fully inclusive mail order price

TASMAN PRINTER INTERFACE

Plug into your Spectrum and drive any printer fitted with the Centronics standard parallel interface. Supplied complete with ribbon cable, connectors, and driving software.

£45 fully inclusive mail order price

All prices include VAT and post and packaging.

TASMAN SOFTWARE

Dept SU

17 HARTLEY CRESCENT LEEDS LS6 2LL

"ADVENTURES INT

"ADVENTURES INT

AVAILABLE FROM W.H. SMITH

AND ALL LEADING CO

Transylvanian Tower

A spine chilling adventure... enter via the dungeons... navigate your way through 500 3-D rooms... survive the swooping vampire bats ... reach the terrifying top... confront and kill Count Kreepie, ridding the world of this Transylvanian Terror.

Can you survive the Top of the Tower? Full save routine for use during the hours of darkness! 48K Spectrum **£6.50**



Super Spy

Locate the secret island hideaway of the mysterious meglomaniac Dr. Death. Follow his trail across continents, through complex puzzles and 3-D mazes. Discover the entrance to his underground lair — but beware — even with your death-defying gadgets his evil henchmen may still win the day!

With save routine for part time secret agents! 48K Spectrum **£6.50**





DEALERS — GENEROUS DISCOUNTS AVAILABLE CONTAC

RICHARD SHEPHERD SOFTWARE

ELM HOUSE, 23-25 ELMSHOTT LANE, CIPPENHAM, SLOUGH, BERKSHIRE.

**CREDIT CARD H
RING (0686)
FOR EXPRESS S**

All programs are sold subject to the condition that they may not, by way of trade or otherwise, be lent, ed ou

NTO IMAGINATION"

MITH, JOHN MENZIES, BOOTS*

NG COMPUTER STORES

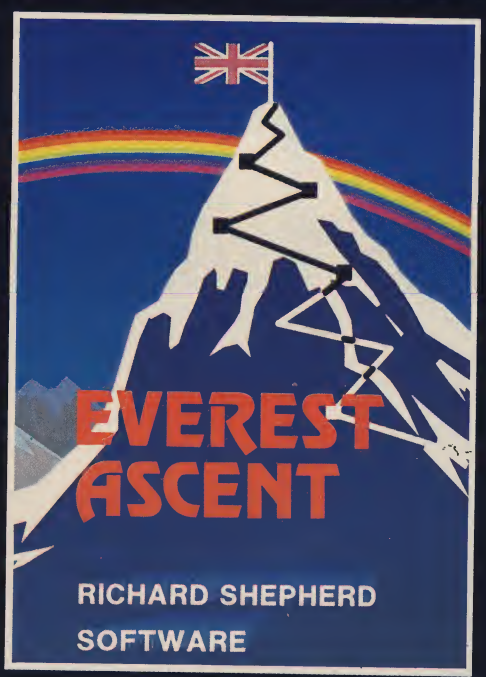




Invincible Island
by Peter Cooke

Exhaust your ingenuity in the quest to find The Seven Parchments of Xaro and their meaning! Will they lead you to undreamt of treasures or eternal doom? Explore the mysteries of the stockade and puzzle within the Pagoda! A spectacular split screen graphic and text adventure to braintease you for weeks!

Adventurous graphics for every location. Save routine. 48K Spectrum **£6.50.**



Everest Ascent

Stake your claim to the top of the world in this strategic vertical adventure. Conquer the summit of the world's highest peak! . . . struggle from base camp to base camp . . . survive the elements . . . watch out for avalanches, thin ice and wayward sherpas . . . encounter abominable snowmen and cross bottomless crevasses!

A game of skill, strategy and planning — a graphic simulation of man's ultimate endeavour! Save routine. 48K Spectrum **£6.50.**

NTACT JOHN SALTHOUSE ON (06286) 63531 FOR DETAILS

ARD HOTLINE
06286) 63531
RESS SERVICE

RICHARD SHEPHERD SOFTWARE

ELM HOUSE, 23-25 ELMSHOTT LANE, CIPPENHAM, SLOUGH, BERKSHIRE.

t, hired out, resold or otherwise circulated without the written permission of Richard Shepherd Software Ltd.

* Selected titles available at larger branches

```
          . . . . . .
        . . .
10 REM DOME DWELLER
20 GOSUB 1000:REM ASSIGN VARIABLES
WHAT?
30 GOSUB 2000: REM PRINT OUT
SAY AGAIN?
GO TO UPDATE 40
TERMINAL NOT CONNECTED!
GO TO CHANNEL ZX ON MONITOR
WHERE ABOUTS IS IT?
GO TO PRINTER
IT ISN'T CONNECTED!
!
!
!
?
?
```



If you've just bought a SPECTRUM or ZX81, the above situation may be familiar to you.

Don't give up – just buy a copy of **I Wish I Knew ... about the SPECTRUM and the ZX81** and see how simple it can be to master the facilities of these machines.

I Wish I Knew ... about the SPECTRUM and the ZX81 provides all the information necessary to use and enjoy these two machines – from plugging in and switching on, to mastering simple programming techniques. Using clear and simple language, it will enable you to create graphic displays and easy games and will help you progress onto more involved programs.

Cased/ISBN 0 273 02029 3/**Only £4.95**

Order today, and start making the most of your computer.

ORDER FORM: Detach and send to:
Pitman Publishing Ltd., Southport PR9 9YF

Please send me _____ copy(s) of **I Wish I Knew ... about the SPECTRUM and the ZX81.** (ISBN 0 273 02029 3/£4.95)

I enclose a cheque/postal order (payable to Pitman Publishing) for £_____

Alternatively please debit my VISA ☐ ☐ ☐ ☐ ☐

Number _____

Signed _____

Name (Block Letters) _____

Address _____

1WK

Pitman

BUFFER MICRO SHOP

310 STREATHAM HIGH ROAD, LONDON SW16 6HG
Tel: 01–769 2887

Open Tues–Sat 10.30 am to 5.30 pm (Closed Mondays)

SOFTWARE FROM ALL THE BEST SUPPLIERS—OVER THE COUNTER—PLUS GROWING RANGE OF PERIPHERALS. SEE IT 'N TRY IT BEFORE YOU BUY IT.

SAE appreciated for catalogue—but please specify for which computer.

DRAGON ZX-81 ZX SPECTRUM

THE WORLD'S GREATEST RANGE OF
SINCLAIR SOFTWARE
PIONEERS IN 1981—WAY AHEAD TODAY

BBC-ACORN KEYBOARDS CASSETTES ADD-ONS BOOKS VIC20

NEW!—BUFFER CLUB for regular customers. Special Offers—Lectures—Foreign Trips—Software Promotions. Ask for details of membership on your next visit.

MEMBER OF THE COMPUTER TRADE ASSOCIATION—YOUR FAIR DEAL GUARANTEE

VISA—ACCESS—AMERICAN EXPRESS—DINERS CLUB
ALL CARDS WELCOME

SOFTWARE LIBRARY
FOR
SPECTRUM

Low cost weekly hire of the best arcade games, adventures, utilities, languages and business programs.

- Membership only £6.00 for 12 months.
- Program hiring from only 80p (plus 25p p&p).
- Free fully descriptive catalogue for members.
- New titles constantly being added.
- Purchase new programs at discount prices.
- Return of post service.
- All tapes despatched using first class post.
- We have full permission and licences from the leading software publishers, to whom royalties are paid.

Compare these features with our competitors and you will see why more Spectrum owners are joining the Kernow Software Library. Join today by clipping the coupon below or send a S.A.E. for further details.

☐ YES, please send me my free catalogue and selection sheet. I enclose my £6 cheque/Postal Order.

NAME

ADDRESS

.....

..... TEL

Send to:

KERNOW SOFTWARE LIBRARY
(Dept. SU)
55 ELIOT DRIVE, ST GERMANS
SALTASH, CORNWALL PL12 5NL

The Galaxy's FIRST ever computer comic!

Zooming into touchdown at W H Smiths, John Menzies and other good newsagents now and every fortnight . . . only 40p.

Order your copy TODAY!

Bursting with great new comic strips . . . exciting stories . . . astounding facts . . . big prizes . . . competitions . . . fascinating quizzes . . . star personalities. And that's just the start of Britain's newest, brightest, most fun-packed comic ever!

LOAD RUNNER

It's the only comic for the age of the computer – it puts the rest back with the dinosaurs!

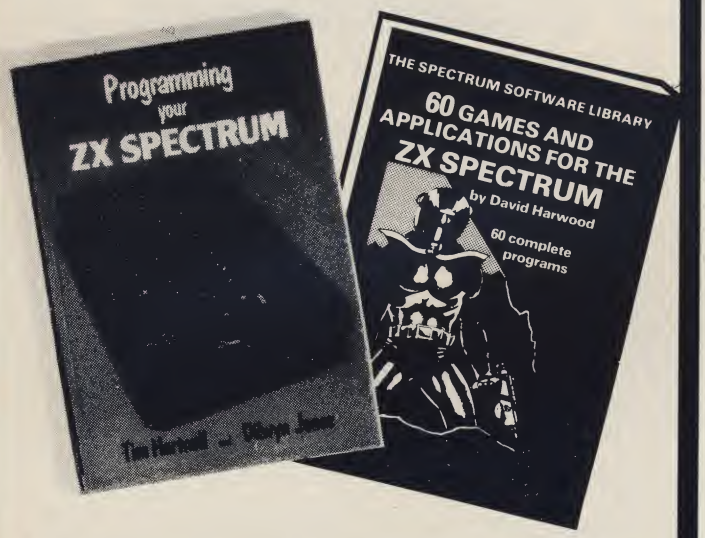


Only 40p

AVAILABLE NOW

and every fortnight . . . order your copy ***TODAY.***

SPECTRUM



Make the most of your Spectrum, with these acclaimed books from the experts!

() **INSTANT SPECTRUM PROGRAMMING** — Tim Hartnell. Spoken word C-60 cassette with book containing many major programs, to teach you programming the Spectrum from first steps. The ideal guide if the Spectrum is your first computer. £4.95.

() **CREATING ARCADE GAMES ON THE ZX SPECTRUM** — Daniel Haywood. Full programming instructions to improve and enhance your own work, with 17 major programs listed in full as a bonus. £3.95.

() **PROGRAMMING YOUR ZX SPECTRUM** — Tim Hartnell and Dilwyn Jones. 200 pages, more than 100 programs, to take your through programming the Spectrum from the beginning. Written by Tim Hartnell, the most widely published ZX author in the world. Recommended by PCW, Sinclair User and Personal Computer Today. £6.95.

() **BEYOND SIMPLE BASIC — DELVING DEEPER INTO YOUR ZX SPECTRUM** — Dilwyn Jones. When you've mastered introductory programming on the Spectrum, you need this oustanding guide to enhanced programming techniques and concepts. £7.95.

() **60 GAMES AND APPLICATIONS FOR THE SPECTRUM** — David Harwood. Arcade games, intelligent board games, brain games and utility programs, they're all here. Just £4.95.

() **GAMES ZX COMPUTERS PLAY** — edited by Tim Hartnell. Thirty great games for your ZX computer, 15 for the Spectrum, 15 for the 16K ZX81. Only £3.25.

Interface Publications,
Dept. SC
44-46 Earls Court Road, London, W8 6EJ.

Please send me the books indicated above. I enclose £_____

Name_____

Address_____

All YOU NEED TO CRACK MACHINE CODE

For the Spectrum 16k & 48k

Test tools for Spectrum & ZX81/TS1000

The ultimate professional tutor and de-bug program. We wrote this to help us write Machine Code!!

• Test and Display Machine Code instructions as they're written • Ideal for both the beginner and expert • Fully documented with 32 page tutorial • HEX: Decimal converter as standard • PLUS • Character Generator of unbelievable quality!!

Full screen editor/assembler for Spectrum

The latest and most comprehensive Editor/Assembler yet produced.

• Full Screen 42 col. input/text editor • Assemble to screen/printer and or tape • Assemble derivatives DEFM, DEFS, DEFW, DEFB, DEFL, ORG, EQU, END • Comprehensive syntax check • Binary, Octal, HEX & ASCII constants • Will even operate as a simple word processor • Fully documented instruction book • Plus Character Generator . . . plus, many, many more, all you've ever needed

Master tool kit for Spectrum

• Re-number facility • Delete copy and move block function • String search and substitute facility • Variable dump • Cross reference • Trace function • Real time clock and alarm system.

POST TO: OXFORD COMPUTER PUBLISHING LTD., P.O. BOX 99, OXFORD

Please send ☐ **Machine Code Test Tool** ZX81
☐ **Machine Code Test Tool** Spectrum
☐ **Editor Assembler** ☐ **Tool Kit**

£9.95 each, any 2 or more **£9.25** (Postage free UK only). Overseas add £1 per program.

NAME.....

ADDRESS.....

Also available from most branches of W. H. Smith and other retailers
Also from Buffer Micro, Streatham

ACCESS CARD NO.....

SU 11

EXPIRY DATE.....

THE TOMB OF DRACULA!



3D HORROR ADVENTURE GAME!

For ZX81 with 16K RAM £3.95
For 48K SPECTRUM £4.95

For the **16K ZX81** or with colour and sound for the **48K SPECTRUM**, a superb 3D graphics adventure game! **Enter** Dracula's tomb at 30 minutes to sunset . . . **wander** through the tomb's pre-mapped 300 vaults in search of the fabled Vampire's Treasure . . . **pick up** valuable silver stakes and use them to defend yourself against the lurking horrors . . . ghouls, zombies, pits of primaeval slime . . . **See** them all on the computer's plan of the tomb . . . when it will let you! **Take** a chance on a Mystery Vault . . . if you dare! And all the time the minutes are ticking by to sunset . . . when **Dracula** rises from his coffin and comes after **you!**

Castle Colditz

ESCAPE-OR-DIE ADVENTURE.....!

For ZX81 with 16K RAM £4.95
For 48K SPECTRUM £5.95

You are an Allied POW in the infamous **Castle Colditz,** Nazi fortress jail for Allied prisoners-of-war! Can you escape with your life through the vast labyrinth of rooms to the main gate? Tackle brutal **Gestapo** and **SS** guards, savage guard-dogs, traps and pitfalls! Survive if you can the **Corridor of Rats,** the **Tunnel of Poisonous Spiders,** the **Vault of Human Bones** and many more! And on your way, grab all the fabulous **Nazi loot** you can carry!

Price includes ready-to-load cassette with library case and inlay, full instructions, postage and packing. **Order today!** Money refunded if not delighted!

Send cash, P.O. or cheque to:

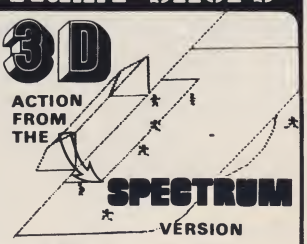
FELIX SOFTWARE (DEPT. SU11)
19 Leighton Avenue, Pinner, HA5 3BW.
Member of the Computer Trade Association

NOW IN YOUR HIGH STREET SHOPS

FOOTBALL MANAGER 3D

by Addictive Games

for SPECTRUM 48K AND ZX81 16K



This superb game is **now available** from branches of

W.H. SMITH * and BOOTS.

Manage your own team in this exciting game of skill which vividly captures the drama and excitement of real football.

FEATURES INCLUDE:

★ 4 DIVISIONS ★ F.A. CUP ★ PROMOTION & RELEGATION ★
★ TRANSFER MARKET ★ TEAM SELECTION ★
★ SAVE GAME FACILITY ★★★ *AND MUCH MORE!* ★★★

WHAT THE PRESS SAY ABOUT IT:—

IF YOU have always wanted to manage a football team,* FOOTBALL MANAGER, *from Addictive Games, is for you — The game is ideal for a football fanatic but the most interesting thing for us was the 3-D graphics used to create the goalmouth action — the game is a winner.
SINCLAIR USER FEBRUARY 1983

Although I'm no great football fan, I really enjoyed playing this game — excellent use is made of colour and user-defined graphics. The game is very logically put together, so that the development of strategy and tactics has a real effect. For example, one of my teams got through to the fourth round of the F.A. Cup where it was beaten by a second division side. This upset morale and meant that our promotion bid failed. Perhaps I should have given up the F.A. Cup run and held some good players back — the possibilities are endless. Brian Clough had better watch out!
* SPECTRUM VERSION ONLY. **ZX COMPUTING FEB/MARCH 1983**

ALSO AVAILABLE FROM THE FOLLOWING SHOPS
BUFFER MICRO SHOP (London)
MICROWARE (Leicester)
ANIROG COMPUTERS (Horley, Surrey)
SUCCESS SERVICES (Walsall)
THE COMPUTER SHOP (Newcastle)
DRAGON BYTE (Leeds)
AND OTHER GOOD COMPUTER SHOPS

PRICES
FOR THE SPECTRUM 48K £6.95, ZX81 16K £5.95
3D GRAPHICS ONLY IN SPECTRUM VERSION
To Order send Cheque P.O. payable to
ADDICTIVE GAMES, Dept SU P.O. Box 278
Conniburrow, Milton Keynes MK14 7NE
PLEASE STATE COMPUTER

A MUST FOR ANYONE INTERESTED IN ZX MACHINE CODE!



The finest range of utility programs for ZX Computers. Used by professionals. Very useful for beginners

ZX SPECTRUM MACHINE CODE SYSTEM
(The key to machine code success)

SPECTRUM EDITOR/ASSEMBLER A powerful and essential machine code programming aid.
16K and 48K on same cassette + full documentation.
Major features: EDITOR with Auto line number and renumber, 40 column screen display, tabulated into fields for easy reading, 5 character label names, easy line editing and cursor control; SAVE/LOAD/VERIFY routines, output to ZX PRINTER. TWO PASS ASSEMBLER accepts all Z80 mnemonics; decimal or hex numbers, simple arithmetic on operands; Assembler Directives — ORG, END, DEFB, DEFW, DEFS, DEFL, EQU, DEFM. **ONLY £8.50**

SPECTRUM MONITOR Machine Code Debug/Disassembler
Enter, Run, Debug M/C programs. Compatible with BASIC. Breakpoints and Registers Display. Disassembler to screen or ZX PRINTER. 16K and 48K on one cassette + 30 page manual. **ONLY £7.50**

ZX81 UTILITIES
(For everyone . . . beginner to professional)

ZX81 REMLOAD Machine Code Debug/Monitor
Explore and master machine code. Compatible with BASIC. CREATE A REM line — any length. BREAKPOINTS & REGISTERS DISPLAY. Fully documented 30 page manual and cassette. **ONLY £6.95** 16K to 64K

ZX81 ZX-MC Machine Code Debug/Monitor
The professional one! ENTER/RUN/DEBUG M/C programs. SAVE/LOAD/VERIFY at double speed. BREAKPOINTS & REGISTERS DISPLAY. Self-contained machine code — cannot be used with BASIC. 36 page manual and cassette. **ONLY £7.50** 4K to 64K

ZX81 SCREEN KIT 1 More screen power in your BASIC programs!
BORDERS — any size anywhere on screen. SCROLL in 4 directions. CLEAR and REVERSE part of the screen. FLASHING CURSOR anywhere on screen — simulates INPUT. DATA FILES SAVE/LOAD BASIC variables — Double speed. 880 Bytes machine code for instant response. Becomes part of your BASIC program. **ONLY £5.70** 4K to 64K

PICTURESQUE PICTURESQUE PICTURESQUE PICTURESQUE

SEND CHEQUE/P.O. FOR FAST MAIL ORDER!
S.A.E. for full details.
6 Corkscrew Hill, West Wickham, Kent BR4 9BB
* All prices include VAT & P&P.

Spectrum Software available from: Buffer Micro Streatham, Microware Leicester. Educational suppliers: Griffin & George.

WE HAVE SOUND . . . COLOUR . . . ACTION WE HAVE R&R SOFTWARE



Whether you have an Oric, Spectrum or ZX81 you can play golf in the comfort of your home.
ZX81 16K (Not illustrated) All the excitement of the professional circuit. For 1 or 2 players. You can select either 9 or 18 hole course. Try and overcome obstacles such as trees, bunkers, water – even the rough can be tricky! Full on screen instructions. ONLY £3.75
Spectrum Golf 16K Similar to ZX81 Golf but utilizing the Spectrum colour graphics and sound. ONLY £3.75
Oric Golf 48K A Further development of Spectrum Golf utilizing 48K of memory and the excellent Oric graphics. For 1 to 6 players. ONLY £7.95
If golf isn't your game try the other games in our range.

FOR SPECTRUM
Star Trek 48K See if you can rid the galaxy of the evil Klingons, save the Federation from the treacherous Romulans, race to protect your star-bases from attack. Are you star-ship commander material? ONLY £4.95
Spectipede 16K See how long you can keep the Spectipede at bay as they decend upon you. You'll have the help of poison mushrooms and your gun which both kill the Spectipedes but look out for the spider – he will try to jump on you. For 1 or 2 players. Operates with most leading Joysticks or the Keyboard. ONLY £4.95
Gnasher 16K The ultimate maze game. Eat the dots but look out for the ghosts they could eat you! If you eat an energy pill you can eat the ghost. Full colour graphics and sound. Operates with most leading Joysticks or the Keyboard.

NEW FOR THE ORIC
Oric Quizzmaster 48K A menue driven quiz game utilizing sound and colour. Instructions are also given to substitute your own questions and answers. Great fun for all the family and ideal for education i.e. revision.
Quizzmaster 1 – General knowledge, sports and pastimes.
Quizzmaster 2 – General knowledge, rock and pop.
Quizzmaster 3 – Out soon.
ONLY £7.95 each which includes a £2.00 discount voucher for your next Quizzmaster.
Further Quizzmasters to follow.

R&R SOFTWARE

34 Bourton Road, Tuffley, Gloucester, GL4 0LE
Tel: (0452) 502819

SPECTRUM GOLF available from WHSMITH

ORWIN SOFTWARE: ZX81 & SPECTRUM

SUPER SOFTWARE AT LOW PRICES

"Michael Orwin has built a reputation for value-for-money software and his Cassette 4 offers quantity as well as quality."

Sinclair User, October '82

"If each game was on a separate tape and selling for £5 each I would still recommend them. But all on one for £5 . . . ! This sort of value for money just has not been seen before on any personal computer."

"Without sounding pushy I would like to conclude this review by saying — if you have a ZX-81 and like games, then you should buy Michael Orwin's cassette 4."

2 extracts from *ZX Computing,* Oct/Nov '82

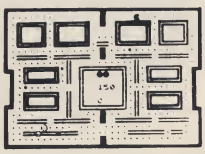
"Eight games, including an excellent version of the Scramble arcade game . . . Easy to operate, graphically impressive and good value for money."

The Times, Saturday 11th December 1982 (about Cassette 4)

NEW! FOR 16K SPECTRUM

(will also run on 48K Spectrum)

CASSETTE A **Ten programs for £6**



GHOST GOBBLER Eat the ghosts before the ghosts eat you. Eat a star and you can chase the ghosts for a while.

ALIENKILL Control lasers, rockets and a force-field to stop the aliens from landing.
MOUSETRAP Trap the mouse in the corner but not anywhere else.
REVERSI A game of skill with simple rules but sophisticated tactics. Play against the computer.
LASER DEFENCE Control the laser sight to shoot down the alien ships. Machine code sound routines.

TANK BATTLE For 2 players simultaneously or play against the computer. Each player has 2 rotate controls and move and fire controls. The tanks fire steerable missiles.
PHOEBUS A puzzle.
BLACKSPOT Gobble the stars and avoid running into black spots created by crossing your own path.
CUBE Manipulate a cube any size from 2×2×2 to 7×7×7.
MINEFIELD Collect the crowns while avoiding the mines and the electrified fence.

plus an extra . . .

GRAPHIC DEMO Did you know your Spectrum could do all this!?

CASSETTE 1, eleven programs (including 7 in machine code) for 1K ZX81 **£3.80**	**CASSETTE 2,** ten games in Basic for 16K ZX81 **£5**	**CASSETTE 3,** eight programs (including 1 in machine code) for 16K ZX81 **£5**

CASSETTE 4 **8 games for 16k ZX81** **£6**

ZX-SCRAMBLE (machine code) with 3 stages.
Bomb and shoot your way through the fortified caves.

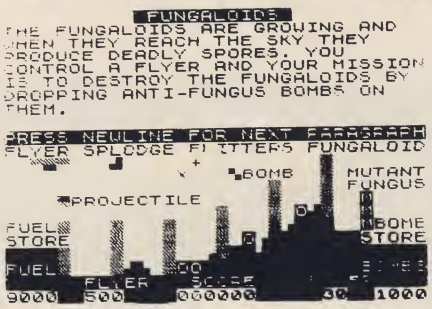


GUNFIGHT (machine code)



INVADERS (machine code)





GALAXY INVADERS (machine code)
Fleets of swooping and diving alien craft to fight off.

SNAKEBITE (machine code)
Eat the snake before it eats you. Variable speed. (very fast at top speed).

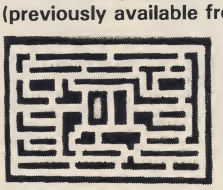
LIFE (machine code)
A ZX81 version of the well known game.

3D TIC-TAC-TOE (Basic)
Played on a 4×4×4 board, this is a game for the brain. It is very hard to beat the computer at it.

7 of the 8 games are in machine code, because this is much faster than Basic. (Some of these games were previously available form J. Steadman).

CASSETTE 5 **8 games for 16k ZX81** **£6**

BYTE-MAN (machine code)
(previously available from Mindseye)



BREAKOUT (machine code)



SPACE RESCUE (machine code)
(previously available from Mindseye)



BLITZ (machine code)



PLANETOIDS (machine code)
Rotate, move, fire and hyperspace controls. Wide range of choice of speed and difficulty.

DODGEMS (machine code)
Dodge the computer's car while eating the dots.

DRAUGHTS (machine code)
Three skill levels.

MERCHANT (Basic)
Make your fortune on trading voyages in the Mediterranean and beyond.

7 of the 8 games are in machine code because it is much faster than Basic.

Please make cheques payable to ORWIN SOFTWARE.
ORWIN SOFTWARE, Dept. OSU, 26 Brownlow Road, Willesden, London NW10 9QL.
ZX81 & SPECTRUM SOFTWARE WANTED

ZX81 + ZX SPECTRUM: SOFTWARE: BOOKS:

also BBC Micro

Cambridge Computer Store

1 Emmanuel Street
Cambridge CB1 1NE
Telephone (0223) 358264/65334
(closed 12.30 – 1.15 except Saturday)

BRIDGE SOFTWARE

THE NIGHT SKY

(for Sinclair Spectrum 16k)

An observer's guide to the stars visible from the UK (48 to 58 North)

Discover the fascination of the limitless heavens.

Create brilliant hi-res starcharts with THE NIGHT SKY and your Spectrum

- Features over 700 different stars
- 5 magnitudes distinguished
- 50 constellations identifiable
- Over 4 million different skyscapes
- Sky colour indicates day, night or twilight
- Ideal for serious astronomers and novices alike
- Make your TV screen a mini planetarium

Trace the movements of the constellations minute by minute, night by night

Send £8.90 for cassette and Manual

Send s.a.e. for full list of our scientific educational, graphics and games software for Spectrum, ZX81, BBC and VIC-20

Full money back guarantee.

Trade enquiries welcome

BRIDGE SOFTWARE

Dept SU, 36 Fernwood, Marple Bridge, Stockport, Cheshire, SK6 5BE, England.

£500 HI-SCORE PRIZE

SPLAT!



SPLAT AN ORIGINAL 48K ZX SPECTRUM CHALLENGE BY THE AUTHOR OF MINED-OUT. OBJECTIVES: EXPLORATION, SURVIVAL AND EATING GRASS!! Zippy, Plums, Rivers, A massive 21K play area, 7 levels to explore. User defined controls, also Kempston & A.G.F. joystick compatible, £500.00 High Score Competition. **SPLAT** evolution by Ian Andrew & Ian Morgan. Also available from all good computer shops.

ATTENTION PROGRAMMERS
TOP ROYALTIES PAID. ORIGINAL PROGRAMMES WANTED FOR ALL MAKES OF POPULAR HOME COMPUTERS.

Please send me copies of SPLAT at £5.50 inclusive 1st Class Post.

I enclose cheque/P.O. for £ or please debit my Access Card No.

Name

Address

.

ISL **INCENTIVE SOFTWARE LTD**
54 LONDON STREET - READING (0734) 591678

PENETRATOR



The all-time best-selling arcade game for the 48K Spectrum

* Amazingly fast arcade action! Includes: * Training Mode and * Unique Customising Feature. The fastest and most exciting game for your 48K Spectrum.

"Melbourne House is fast gaining a reputation for classy products, and this is no exception. Penetrator is unique in its customisation features and will astound those who like to sneer at arcade-style games played on home computers."

PERSONAL COMPUTER WORLD

Penetrator is written entirely in machine language and takes up almost all of the 48K memory. If you have a 48K Spectrum, then you must have Penetrator!

Orders to: Melbourne House, 131 Trafalgar Road, Greenwich, London SE10

Correspondence to:
Melbourne House, Tring, Hertfordshire

All Melbourne House cassette software is unconditionally guaranteed against malfunction.

Trade enquiries welcome.

☐ Please send me your free 48 page catalogue.

Please send me:

48K SPECTRUM Cassettes

☐ The Hobbit	£14.95
☐ Penetrator	£6.95
☐ Terror-Daktil 4D	£6.95
☐ Melbourne Draw	£8.95
☐ H.U.R.G.	£14.95
☐ Computer Bridge	£8.95
☐ Abersoft Forth	£14.95
	£
Please add 80p for post and pack	£ 80
TOTAL	£

SU11C

I enclose my ☐ cheque
☐ money order for £

Please debit my Access card No.

.....

Expiry Date

Signature

Name

Address

.....

.....Postcode

Access orders can be telephoned through on our 24-hour ansafone (01) 858 7397.

MELBOURNE HOUSE

John Gilbert continues his series on an alternative language by considering one of the most important and fundamental concepts

The decision of the Editor must be final

THE FORTH EDITOR is one of the most important and fundamental concepts in the language. Using it you will be able to enter, amend and delete parts of Forth programs, which you will remember are called words.

The Editor and the screens on which it operates are important, as they will allow you to keep a record of words which have been entered into the system. As we detailed last month, when a word is compiled into the Forth dictionary the constituent parts of that word are lost. You can no longer see the listing or how the word was constructed.

For instance, last month I defined a word which found the number of bytes which are left free in the computer memory. That was accomplished with the statements shown in figure one. From that figure you can see how the word was created but as soon as you enter it into the dictionary the statement is lost.

A permanent record of a word can, however, be kept in one of the sections of memory which are designated as screens. Those screens will list a program just as you are able to list a program in Sinclair Basic. That is called the source, or text, listing.

> 'When a word is compiled into Forth the constituent parts of that word are lost'

Abersoft Forth can store up to 12 screens of words. They are numbered from zero to 11. Each of those screens takes 1,024 bytes of RAM and is structured as 16 lines with a potential of 64 characters on a line. That has nothing to do with the lines on the screen of the Spectrum or, if you are using it, the ZX-81, but it is just a method of dividing sections of memory in the machine.

The screens take 11K of RAM and, because of the speed at which information can be accessed by the Forth system, Abersoft has called this memory the RAM disc. When you first enter the Forth compiler you should type

DISC—INIT

to clear the disc and leave the RAM ready for new input.

You should then type

EDITOR

to invoke the commands for the source input and line manipulation. To select the screen page which you want to use, type the page number and CLEAR. In this case we shall use page one.

1 CLEAR

Then list that page by typing 'L'. You will see a heading at the top of the page which will indicate that you have accessed the correct screen. You will then see a list of numbers running down the left-hand side of the page.

It is best to start putting your word definitions on page one as page zero is reserved for comments about your pro-



gram code. That means you can document your Forth words on that page and the explanations can be accessed by typing

0 LIST

If you want to remove all the source from that or any screen type

0 CLEAR

where '0' is the number of the page.

To put textual comments on page zero or any other screen you should type the line number, followed by the letter 'P' and then the remark. That type of statement will operate in the same way as REMark in Sinclair Basic—in other words it will have no effect on the running of a Forth program.

Just as screen zero can be used for comments, so can line zero of every screen page. That means you can put a title on a page of words. That is done in the same way as it was for screen zero:

1 P THIS IS THE TITLE

To put a word definition on to the screen you must select your page, which is one in this case, and develop the word definition using the colon (:) to start and the semi-colon (;) to finish in the usual way. The only difference is that you have to add a line number to the beginning of the text.

To put the BYTES FREE definition on to screen one you would type

1: BYTESS ." NUMBER OF BYTES FREE= " FREE .;

If you have any extra code you could put it on to other lines of the screen, although 64 characters on a line should be sufficient for most purposes.

You can put several words on one screen. All you have to do is to indicate to the computer that the text you are entering is a definition by using the colon at the beginning of the word.

After you have entered the definition you may want to save it as a source listing before you compile it into the Forth dictionary. To do so you must save the whole disc file on to tape, using the SAVE command. To check that the file has been saved correctly most Forth packages have a VERIFY command. All you have to do is wind back the tape to the beginning of the file and replay it into the computer. If you have any problems with the VERIFY routine or crash back into Basic, refer to your language system manual to see how to recover with a 'warm start'. That will leave your disc file intact and you can re-SAVE.

When you have SAVEd the disc source code you can safety compile the original, which is still in memory. To do so type the colon which puts the computer into compile mode. That will compile all the words which are contained on the disc. If you want to compile a selected word you should type the colon, followed by the name of the word.

To check that the definition has been compiled correctly VLIST the present dictionary. Your new definition should be the first on the list.

Try running your new BYTES word. If it does not work, you have the source listing on tape which you can alter and compile again. Just LOADT the relevant disc into memory and type the number of the page on which you put the word definition, followed by the usual space and the command LOAD.

You will then have the relevant page in memory and all you have to do is LIST it and make your alterations by invoking the EDITOR for your particular system.

The Forth Editor provides some complex commands which will operate on screen lines and words. Some versions of Forth may have have slightly different commands, so you should refer to your manual before making alterations.

When you can save words on to disc and recall them you can develop your own programs. To give an introduction to the more complex applications with which I will deal next time the following program will show what can be done with one Forth word.

You may have noticed when looking through the main dictionary that few mathematical functions are included. One of the reasons is that Forth is adaptable and, unlike many versions of Basic, you can define your keyword definitions.

In mathematical circles the function for finding the square of a number is important and therefore useful to have in your Forth dictionary. This word definition will put it in there for you:

:SQUARE DUP DUP * ;

You may wonder what that strange word DUP is in the definition. It is a word which I have not yet dealt with and means double. The action of DUP puts a specified value on the Forth stack and then generates a duplicate of that number which is put on the stack on top of the first value. You can see the action of this word by typing:

4 DUP .

in immediate mode.

Now you can understand how DUP works you should be able to see how the definition SQUARE operates. It puts four copies of the specified number on to the stack and then it does the multiplication using those values. The result will be the square of the original number followed by that root number. For instance, if you typed

100 SQUARE

you should finish with the computer output

100 100 ok

You could produce word definitions which will give you a full set of mathematical functions and even give those new words the names of the keywords which provide the same functions in Basic. For instance, you could call the square root word SQR and use COS for cosine.

'You could produce definitions which give a set of mathematical functions and even give those words the names of the same Basic keywords'

You should appreciate, however, that although the names are the same, their arguments or the numbers on which they operate will be before the words and not after.

A few simple Forth words have enabled us to provide Basic mathematical functions in Forth. This is the least of what can be done, as you will see when I examine graphics commands for Abersoft and Artic packages next month.

```
: BYTES ." NUMBER OF BYTES FREE= " FREE . ;
```

Figure 1.
Word definition of BYTES

```
INIT-DISC

EDITOR

1 CLEAR

0 P TITLE OF WORD

1 : BYTES ." NUMBER OF BYTES FREE= " FREE . ;

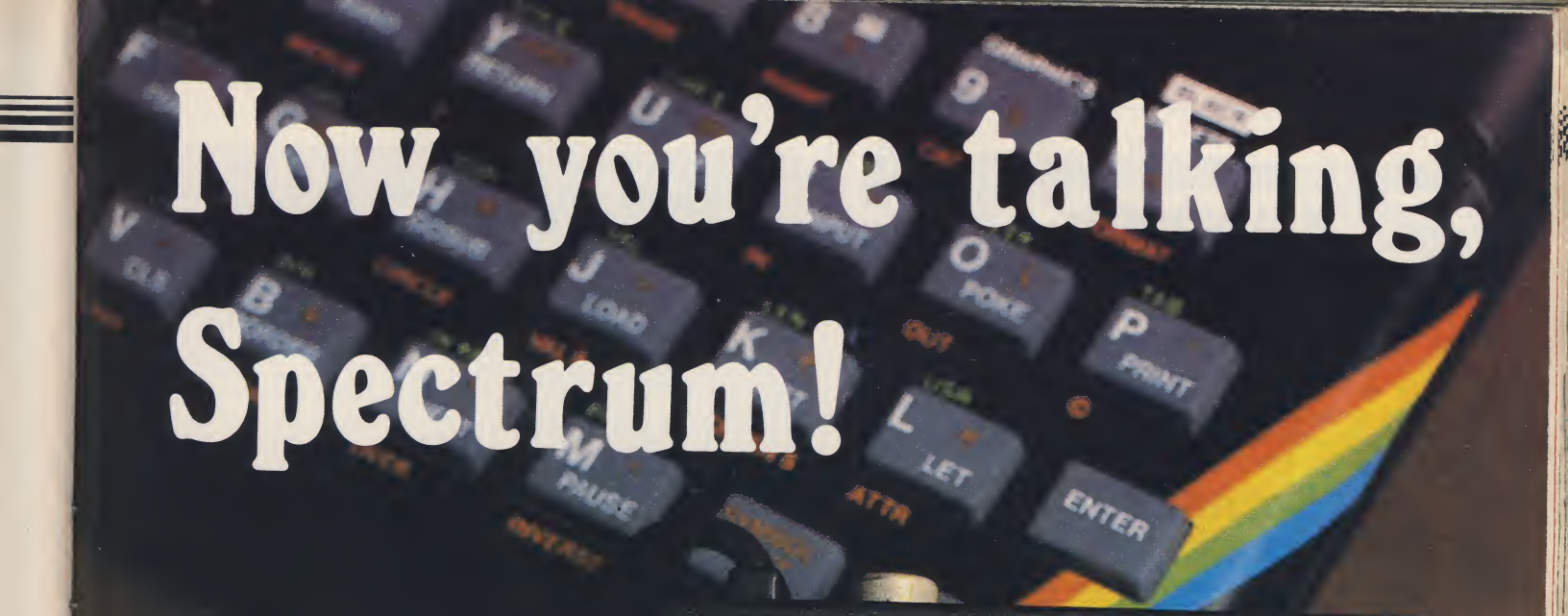
SAVET

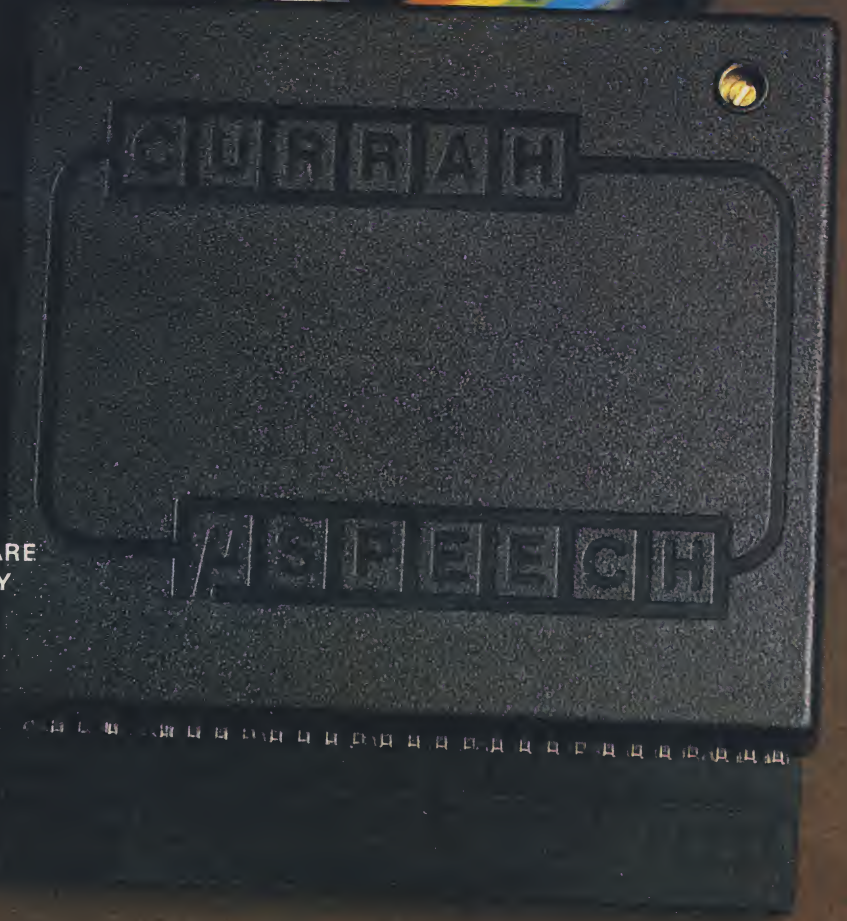
VERIFY

:
```

Figure 2.
Step-by-step entry of a word on to a screen.

Now you're talking, Spectrum!





- μ SPEECH AND SPECTRUM SOUND FROM YOUR TV
- μ INFINITE VOCABULARY
- μ INTONATION TO ADD CHARACTER
- μ INTEGRAL USER-FRIENDLY SOFTWARE DRIVEN BY CUSTOM GATE ARRAY
- μ EASY TO USE:
 LET S$= "HE(LL)(OO)"
 WILL SAY "HELLO"
- μ PLUS
 EXCITING GAMES AND SPEECHWARE FROM LEADING SOFTWARE HOUSES

Adding a new dimension with

CURRAH μSPEECH

Send to: MICRO SPEECH OFFER, P.O.BOX 1, GATESHEAD NE8 1AJ
or telephone: NEWCASTLE (0632) 824683

Please send me MICRO SPEECH units.

Name (Print clearly)

Address.....

.....

.....Postcode.....

I enclose Cheque/Postal Order payable to "Micro Speech Offer"
or debit my Barclaycard/Access account No. ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

I understand that I can have my money back within 10 days of purchase if I am not delighted.
Please allow 21 days for delivery. 12 months parts and labour guarantee.

Signed..... Ref SU 1

ONLY

£29.95

EACH
ALL INCLUSIVE

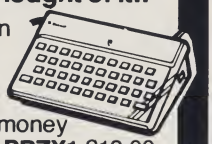
FREE GAMES & DEMO CASSETTE
plus comprehensive manual

SENSATIONAL

KELWOOD POWER BASE

COMPLETES YOUR COMPUTER

It's so good, Clive should have thought of it!!



● ON/OFF switch for instant screen clearing ● LOAD/SAVE switch ● All wires included ● Angled for easier use ● Saves wear and tear on connections ● Real value for money

Spectrum Ref **PBS1** £13.50 ZX81 Ref **PBZX1** £13.00.

AND ALSO

SOUND POWER BASE

GET REAL SOUND FROM YOUR SPECTRUM

All the features of the Power Base plus built-in variable sound amplifier Ref **SPB1**

Amazing value at ONLY £19.95

The great Spectrum sound improver

SUPER SOUND SPEC-AMP

● Fully adjustable Spectrum Sound Amplifier ● Simply plugs into mic. socket

Ref **SSS** ONLY £7.00 (PP3 Battery included)

ZX81 RAM-PACK WOBBLE?

SOLVE IT WITH A

KELWOOD WOBBLE STOPPER

● Firmly clamps Ram-Pack to computer ● No glue ● No solder ● Easily removed

Flat: Ref **SW** £5.25. Tilted: Ref **STW** £6.25

Extra long for printer – Flat: Ref **LW** £5.75. Tilted: Ref **LTW** £6.75

COMPUTILT

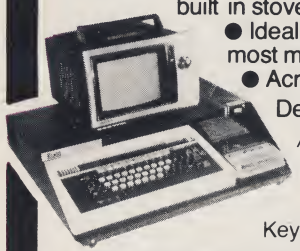
ANGLED STAND

'For a better angle'

Fits ZX81 or Spectrum Ref **CS1** Terrific value – ONLY £3.50

KELWOOD almost WIRELESS WORKSTATION

● Mains ON/OFF switch ● 4x13 amp sockets inside ● Supreme quality ● All wires stow away ● Carrying handle ● Easily stored ● Sturdily built in stove enamelled steel ● Ideal for schools ● Suitable for most micros including Sinclair and BBC ● Acres of room for all peripherals



Desk top model Ref **CW1** £49.00

Accessories for above

Power Base Ref **PBS2** £11.00

Power Base Ref **PBZX2** £10.50

Legs Ref **LCW** £11.00

Keyboard Dust Cover Ref **KDC** £2.50

All prices include VAT and postage and packing

ORDER FORM

Name

Address

..... SU

QUANTITY	REF	AMOUNT
	TOTAL ENCLOSED	

Please send me further information with no obligation

☐ *Tick if required*

KELWOOD COMPUTER CASES VISA

Downs Row, Moorgate, Rotherham. **Tel: (0709) 63242**

BETA BASIC

ENHANCED BASIC FOR THE ZX SPECTRUM 16/48K

26 NEW KEYWORDS — 10 NEW FUNCTIONS — MANY EXTRA FEATURES

Keywords include:

ALTER	– allows extensive manipulation of the attributes file.
AUTO	– for automatic entry of line numbers.
CLOCK	– controls a digital clock with alarm and alarm-initiated GOSUB facility.
DELETE	– any block of lines.
DO	– DO. . .LOOP structure, with WHILE, UNTIL and EXIT IF.
DPOKE	– double POKE.
EDIT	– a specified line number.
ELSE	– used with IF. . .THEN.
GET	– waits for keyboard entry; doesn't use ENTER.
KEYWORDS	– shifts between new keywords and normal graphics mode.
ON	– GOSUB or GO TO a line number from a list of line numbers.
ON ERROR	– allows trapping of most reports; has available ERROR, LINE and STAT variables.
POP	– removes data from BASIC's stack.
PROC	– named procedures, with DEF PROC and END PROC.
RENUM	– renumber part or whole program with specified start line and increment. Handles GO TO, GOSUB, ON, etc.
ROLL	– pixel movement of part or whole screen in any direction, with wrap-round.
SCROLL	– as ROLL, but without wrap-round.
SORT	– sorts part or all of string or numeric arrays according to specified substring or column. SORT INVERSE sorts in reverse order. One hundred strings can be sorted in about one-fifth of a second!
TRACE	– allows display of line and statement numbers as a program is running. Display of selected variables, single stepping, and reduced speed are also possible.
USING	– used with PRINT; formats numbers.

Functions provide:

Conversion between decimal and hexadecimal — conversion between integers and two-character strings (allows "integer arrays") — formatting of numbers — INSTRING and STRING$ equivalents — amount of free memory — double PEEK — current time.

Features include:

Single-entry keywords (in graphics mode) with syntax check on entry — seven new error messages — compatibility with Spectrum BASIC — program occupies just 5.6K — cursor can move in all directions in a line being edited — flashing current line pointer — BREAK gets you out of even machine code lock-ups — PLOT lets you plot string anywhere on the screen — PLOT and DRAW scale and offset values can be set using XRG, YRG, XOS and YOS — 16K and 48K versions on same tape — comprehensive manual.

Only £11.00 inclusive!

Please send me copies of **Beta BASIC.**
I enclose cheque/p.o. for £.....

Name:.....

Address:.....

.....

.....

BETASOFT
92 Oxford Road, Moseley, BIRMINGHAM B13 9SQ

At Last!
Stop plugging in and out!
FIT OUR 2-WAY TV AERIAL PLUG
Stop constantly unplugging & replugging your aerial every time you switch back to TV after using your computer. Just fit this 2-way adaptor, and leave both your Spectrum & your TV plugged in all the time. Also lets you use two TVs from one computer..£2.50

angles
THE UNIQUE STRATEGY GAME
Pit your wits against this mind-stretching program. The game is simple, but winning not so easy.....£4.95

games for christmas!
Up to THREE players can play this superb version of that favourite old game, pontoon. Full card display, and £100 each to gamble.....£2.95
Think you're clever? Try to beat the machine in this ace version of crib.....£2.95

minimal systems
eighteen nelson road
southsea, hampshire

At last, the first joystick that puts the firing button where it should have been in the first place.

Extra responsive action

Trigger Fire Button

Diamond Cut 'Arcade' Style Grip

TRIGA COMMAND

IS HERE!

Extra long 4 ft Cord



Rubber Suction Cups for One Hand Operation

The Top American Joystick is now available in the U.K. . . .

To fit your SPECTRUM

ONLY £19.99 + £1.50 P+P

- *Including Interface to plug straight into the Spectrum.*
- *The first Joystick to give you "Arcade" feel and control.*
- *"Jet Style" heavy duty, diamond cut grip.*
- *Fire Trigger placed under your index finger . . . the finger with the fastest reflex action.*
- *Self centreing, 360° action.*
- *Compatible with most of the latest Software including:*

Jetpack	*Slippery Sid*	*Brain Damage*	*Frogger*
Cookie	*SS Enterprise*	*Last Sunset*	*Blind Alley*
PSSST	*Nite Flite*	*Mazeman*	*Galactic*
Timegate	*Meteoroids*	*Galaxians*	*Jailbreak*
3D Tunnel	*Gulpman*	*ETX*	*Transam*
Cosmos	*Cosmic Guerilla*	*Frenzy*	*Robotics*
Cyber Rats	*Kong*	*Astroblaster*	*Armageddon*
Galaxians	*Armageddon*	*Knot in 3D*	*Exterminator*
Spookyman	*Mission Impossible*	*Joust*	*Detective*

NOTE: THIS IS ONLY A SMALL SELECTION OF THE MANY COMPATIBLE GAMES

**** Also available for Commodore/Atari***

Item	Amount
Spectrum Trigga Command	£19.99
VIC/CBM 64 Trigga Command	£12.99
Atari Trigga Command	£12.99
Interface Unit only*	£11.99
* To use with your own Joysticks with Spectrum	
ALLOW 7 DAYS — P+P	£ 1.50

TRADE ENQUIRIES WELCOME

24 HRS CREDIT CARD LINE

Access BARCLAYCARD VISA

DATEL ELECTRONICS

27 HOPE STREET, HANLEY, STOKE-ON-TRENT
TEL: 0782 273815

Regardez!

NEW SPECTRUM VERSION

48K SPECTRUM

Kosmos Software

A French Language Learning Aid.



- ★ Pupils
- ★ Teachers
- ★ Travellers
- ★ Students
- ★ Graduates
- ★ Linguists
- ★ In fact anyone having an interest in French will benefit from this unique language learning aid

★ Available for **BBC model B** **SPECTRUM 48K**

★ Ready made lessons provide an enormous vocabulary of words, phrases and verbs arranged in subject groups.
★ Lessons can be run in three ways; learning, self-test or speed and accuracy test.
★ Lesson displays include all French accents; different colours for masculine and feminine words.
★ Full tape editing facilities allow an infinite number of new or updated lessons to be created and stored for later use.

Choice of Level A or B cassettes with totally different vocabularies.
£9.95 each (P&P inc.)
Both cassettes include extensive word lists; verbs and phrases are introduced in Level B. Available from dealers or mail order.
State BBC or Spectrum.
COMING SOON! "The German Master", "The Spanish Tutor"

Kosmos SOFTWARE
Unit A,
1 Pilgrims Close, Harlington,
Dunstable, Beds. LU5 6LX
Tel: 05255 3942

NOW 2ND GREAT YEAR!

HIRE

ZX81/SPECTRUM PROGRAM TAPES

JOIN OVER 7,000 DELIGHTED MEMBERS!

ADVENTURE GAMES
ARCADE and SIMULATION GAMES
BUSINESS and PRACTICAL PROGRAMS
UTILITIES
M/c COMPILERS
EDUCATIONAL
AND ★ MORE!

FREE ILLUSTRATED QUARTERLY MAGAZINE WITH TIPS, NEWS, REVIEWS, DISCOUNT OFFERS PLUS OUR TOP 40 TAPES CHART BASED ON THOUSANDS OF SCORES!

UP TO 2 WEEKS FOR ONLY £1·20 INCL. FIRST CLASS POST and VAT!

CHOOSE FROM TAPES BY 40 TOP SUPPLIERS ALL WITH PERMISSION!

YOUR FIRST TAPE FREE BY RETURN IF YOU JOIN WITHOUT DELAY USING THIS SPECIAL COUPON!

THE ORIGINAL SINCLAIR LIBRARY.

TO: SINCLAIR OWNERS' SOFTWARE LIBRARY, Warren Road, Liss, Hants GU33 7DD.

NAME

ADDRESS

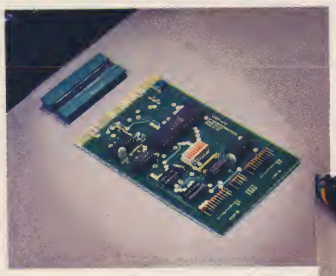
MACHINE:

MAIN INTEREST (for free tape)

Enclose £9.50 for year's membership (Spectrum) or £7.50 (ZX81); overseas (Europe only) + £2 unless with local branch.

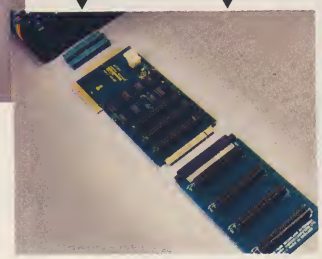
Overseas branches:
Benelux: Jacobsmitslaan 75, B-2400 MOL, Belgium (mem. fee 44 & 49 Guilders/790 & 890 Bfr);
Eire: Softenk, 120 South Circular Rd, Dublin 8 (£12.50 punt);
South Africa: P.O. Box 1769 Manzini, Swaziland.

SU



▲ Any single extension card

Backplane up to 3 cards + Backplane up to 4 cards



= 7 cards ▶



ZX Spectrum expansion... ...start with one card... extend up to seven cards!

The price/computer power ratio of the Spectrum is tremendous but up to now its lacked one major thing compared with other Z80, 48K computers costing many times more – expandability.

U-Microcomputers have been the UK leaders in Apple Expansion cards but with the Spectrum we've had to provide the means to expansion (3 and 4 slot backplanes) as well as the initial range:

USP-ADAP – a back to back adaptor needed when you buy your first card and later for the backplane.

USP-BBP3 – a buffered 3 slot back plane, meaning it won't interfere with the Spectrums operation. It will generally require an auxiliary power supply either home built or the USP-Power supply unit (available later). A side connector allows use of the ZX printer and microdrives.

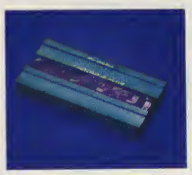
USP-BPE4 – provides a further four slots after you have the USP-BBP3.

USP-PROT – Prototyping card – use to design and test your own circuits.

USP-232D – dual channel serial RS232 interface using the sophisticated and very powerful Z80DART chip. Includes LPRINT and LLIST patches and a terminal emulator program. Baud rate 75-9600, full handshaking available. Manual 50 pages.

USP-I/O – general purpose parallel interface using the versatile Z80PI0 chip. Use to connect to parallel printers, music synthesisers, plotters, D-to-A, and A-to-D, converters, relays, LED's.... It provides two 8 bit input or output ports with 4 handshake lines. Manual 30 pages.

USP-CENT – a kit for use with the USP-I/0 for Centronics compatible printers. Includes cable from USP-I/0 and LPRINT and LLIST drivers.



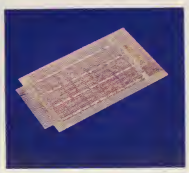
USP-ADAP



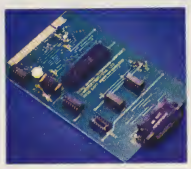
USP-BBP3



USP-BB4



USP-PROT



USP-232D



USP-I/O

Quality features – all the boards (except the USP-PROT) have gold plated edge connectors, and solder resist both sides for long term reliability. Comprehensive documentation for beginner or expert included with each board.

USP ZX Spectrum Expansion 'make it easy on yourself'

Future plans

We've got a further 5 boards at the design stage and plans for more after that. But our policy is not to announce until they are actually in production with stock on the shelves. Sorry!

U-Microcomputers Ltd., Winstanley Industrial Estate, Long Lane, Warrington, Cheshire, WA2 8PR.

START NOW

ORDER HERE!

Qty	Item code	Price each £	Total £
	USP-ADAP Adaptor	6.90	
	USP-BBP3 3 slot buffered backplane	35.65	
	USP-BPE4 4 slot backplane extension	25.30	
	USP-PROT Prototyping board	13.80	
	USP-232D Dual serial interface	34.50	
	USP-I/O General purpose parallel interface	29.90	
	USP-CENT Centronics Kit for USP-I/O	3.45	
		plus p.& p.	£1.50
		TOTAL	

Please tick if VAT invoice required ☐

Please send leaflet ☐

To: U-Microcomputers Ltd., Winstanley Industrial Estate, Long lane, Warrington, Cheshire, WA2 8PR

I enclose cheque/Postal Order made payable to U-Microcomputers Ltd., for

£.....

Name

Address

Post Code

12 months warranty. Mail Order only. Western Europe add £2.00

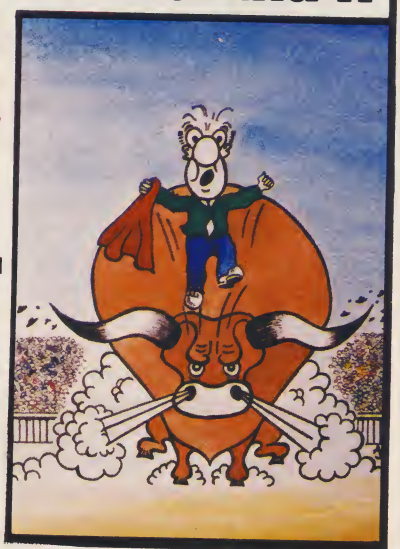
SU.11

RWP/Graphic Design

NEW from Mikro-Gen

More sensational software

Mad Martha II



The great sequel to Mikro-Gen's chart-hitting 'Mad Martha'

From Saturn Developments

Full adventure format + accepts multiple commands in one entry + Skill level select + Exciting arcade-type games an integral feature + Full help facility and save game command + Full screen, high-res, colour graphics.

FOR 48K SPECTRUM ONLY £6.95

Continuing the top-selling saga of Henry and Martha's stormy relationship, this hilarious graphic adventure (in real time) is set in Sunny Spain, where Henry encounters wacky waiters, mad bulls, and, of course, the wrathful Martha

"The top quality professional product is what I've come to expect from Mikro-Gen"
'Home Computing Weekly'



Mad Martha
Hen-pecked Henry steals his wages from his wife's purse for a wild night out in this chart-hitting game. Henry's problems include the baby, the cat, and his axe-weilding wife, Martha. You're Henry. Watch out for the axe!
ONLY £6.95
For 48K Spectrum



Nanas
You're starving in the jungle. You can't reach the bananas. So a friendly monkey knocks them down for you – but also knocks down the coconuts which give you a killing headache (literally!). Simple in concept, hilariously entertaining with its superb graphics. It will drive you Bananas!
ONLY £5.95
For 16K/48K Spectrum



Creepy Crawler
An authentic version of Centipede, one of the most addictive arcade games devised. All the usual features, with full use of Spectrum graphics and sound.
ONLY £5.95
For 16K/48K Spectrum



City Defence
A wonderful version of an arcade favourite. Save the city from annihilation – knock out the bombs with your laser cannon. Nine skill levels, bonus points for attack ships.
ONLY £5.95
For 16K/48K Spectrum



Pat the Postman
So Original, it has to be seen to be believed – all Pat has to do is collect parcels from the houses, whilst avoiding obstacles... like cars, fires, the parcels train, etc. Skill level and Hall of Fame included.
ONLY £6.95
For 48K Spectrum

Other great new Mikro-Gen programs coming soon – watch out for them!

Please make cheques/PO payable to 'Mikro-Gen' and add 40p post & packing per order. Send mail orders direct to:

Available from retail outlets

BARCLAYCARD VISA Access

PHONE YOUR VISA OR ACCESS NUMBER

MIKRO-GEN

Mikro-Gen, 1 Devonshire Cottages, London Rd, Bracknell RG12 2TQ Tel: 0344 27317

Finding a way to display important information

The ability of computers to complete calculations at high speed is wasted by badly-presented results. John Armfield reports

IF YOU want a neat display for that business game or you are about to devise your own database or electronic worksheet you need arrays, subscripted variables and a justified display. A table of numbers like that in diagram one might record the sales in each month, the calculations for a payroll, or a football score chart. Lines and columns in such a table are the key to creating arrays and displaying them on the screen in a format easy to read.

You can add them, multiply one line or column by another and save the data on tape to be recalled for another set of calculations later.

Put a DIM statement at the front of your program to allocate memory space for the table you plan, e.g., 10 DIM T(5,3) will allow for a table of numbers with five lines and three columns. For a table of numbers with five lines and one column you need only to state 10 DIM T(5). The computer will assume the 1.

Each piece of data in the table can be identified according to the line and column it occupies. In diagram one line 1 column 1 contains the number 3. So T(1,1)=3 and T(3,2)=1

In that table — or array as it is known in Basic — T is the variable; the line and column numbers are the subscripts. You can call-up any piece of data by specifying its name.

PRINT T(1,1) will print the number 3. Any number of lines and columns are possible until you run out of memory. You can have many tables or arrays in your program, each with a different variable name or letter. It is usual to do so.

The program in diagram two will read data into a table and print it. Line 10 establishes the size of the table as having two lines and three columns. The nested loops of L and C read each number in DATA into position. Enter the program and RUN it to see the result so far.

When it is more convenient data can be entered from the keyboard using INPUT instead of READ. Replace line 40 of the program with 40 INPUT "?";T(L,C). Then key-in a new set of numbers. Each one will be printed in the table as it is entered.

The PRINT statement in line 50 of the program spaces the display using TAB. In this example it multiplies the column number by five, positioning each column five spaces apart. That is a simple device when there are only a few columns and they fit on to the screen. When you have more columns it may be preferable to use the TAB statements in lines 250 to 280 of diagram three. You may have noticed that numbers with two digits or more make the display a little ragged, since they justify from the left. For a neater column of numbers we can arrange for them to justify from the right by replacing line 50 with:

Continued on page 121



Diagram 1. Table for variable T.

```
10 DIM T(5,3)
20 FOR L=1 TO 5
30 FOR C=1 TO 3
40 READ T(L,C)
50 PRINT TAB C*5;T(L,C);
60 NEXT C
70 NEXT L
80 DATA 3,7,5,4,6,7,4,2,1,3,4,5,13,12,14
```

Diagram 2. Read data into a table — an array — with five lines and three columns

	C: Columns 1)	2)	3)
L: Lines 1)	3	7	5
2)	4	6	7
3)	4	2	1
4)	3	4	5
5)	13	12	13

e.g., T(1,3) = 5
e.g., T(5,2) = 12

Continued from page 120

50 PRINT TAB c*5-LENSTR$T(L,C);T(L,C);

The expression LEN STR$ calculates the length of the number before it is printed and nudges it into place. Or to be even more sophisticated you can round all numbers to two decimal places and print zeros before and after the decimal point according to the need. See lines 350 to 390 in diagram three.

Insert the program in diagram three and you will be able to print either all or part of your table. For a large table select the number of columns to fit on the screen. Lines will scroll as normal.

Look more closely at the print routine. First the column numbers are printed by lines 250 to 300. As you become more ambitious you might wish to print column headings instead. Then the data is printed a line at a time, each line preceded by the line number — especially important when printing only part of the table. The line number is right-justified, too.

Using the variable TB to space the columns in this example makes spacing independent of the column number, so that a large number of columns does not cause your computer to wish it had a bigger screen. The semicolon in the PRINT statement keeps the print position in place until all the columns are complete. Try omitting it to see what happens. If you wish to space the lines you can add two apostrophes to your print statement, i.e., PRINT ".

When preparing a budget for your small business each column of your table might represent a month of the year, each line a category of expenditure or income. You can use your worksheet to total your expenses and subtract them from income so that you can forecast your profit. To calculate the effect of inflation, multiply the cost of materials by 1.1 and see if you can stay in business.

Calculations on the data are the essence of an electronic worksheet. Before you start, though, make sure that your table is big enough to accept any more lines and columns you need.

> 'Make sure your table is big enough to accept any more lines and columns'

Alter the DIM statement in our working example to:

10 DIM T(6,4) and enter some data.

To multiply the numbers in column two by three, insert the routine:

100 FOR L=1 TO 5
110 LET T(L,3)=3*T(L,2)
120 NEXT L

RUN the program to see the result.

Multiply the numbers in column three by the numbers in column two and place each result in column four by amending this to:

100 FOR L=1 TO 5
110 LET T(L,4)=T(L,3)*T(L,2)
120 NEXT L

RUN the program again.

To add all the columns so that their totals are in line six insert the routine in diagram four and print the result. That gives some idea of what is possible.

A point to note about diagram four is the way in which line 110 sets the value of T(6,C) to zero at the start of the addition for each column.

INT is a valuable function used to advantage in lines 350 to 380. It simply cuts off all digits after the decimal point, which is satisfactory for rounding-down purposes. Adding 0.5 beforehand facilitates rounding-up when appropriate. Line 350 rounds the data to two decimal places. Diagram five gives a step-by-step breakdown of how it works.

Line 360 converts the number after the decimal point into a string. Line 370 looks at it and adds a decimal point if it does not have one. That applies only when there are two zeros to be printed. Line 380 converts the figures before the decimal point to a string and inserts a negative sign if the data is less than zero.

The ABS function helps the computer get its arithmetic correct in this example by making sure that it works with positive values for some of the operations.

Save your program on tape and the data will be saved with it. You will be able to load your program and use the data again, provided you start with a GOTO statement and not RUN.

You can save and load your data separately, with a Spectrum, even use it with a different program, and so stand no chance of losing it. Use the statement SAVE "Name" DATA T().

That will take all the data you have called T(L,C) in this example and save it under the name you specify. You can load it back into any program you wish by using the statement:

LOAD "Name" DATA T().

Make sure that a new program contains the appropriate DIM statement. Develop this program further into your own version of Vu-Calc. I suggest that you set up a fixed size table of say DIM T(10,10) proportions or smaller. Write sub-routines to Insert Data, Add/Subtract, Multiply, Divide, Summate lines/columns, Print.

Each of them can be called-up from a menu. Add a few other subroutines to trap keyboard errors so that a fast finger fumble does not catch you by surprise, e.g., 235 IF CE-CS>3 THEN LET CE=CS+3 will avoid the problem of asking the computer to print too many columns. Then ask a friend to run the program you have written. He should be able to use it as well as you can.

```
200 INPUT "PRINT TABLE FROM
LINE NO  ?";LS
210 INPUT "PRINT TABLE TO LINE
NO  ?";LE
220 INPUT "PRINT TABLE FROM
COLUMN NO  ?";CS
230 INPUT "PRINT TABLE TO
COLUMN NO  ?";CE
240 CLS
250 LET TB = 7
260 FOR C = CS TO CE
270 PRINT TAB TB;C;")";
280 LET TB = TB + 7
290 NEXT C
300 PRINT
310 FOR L = LS TO LE
320 LET TB = 7
330 PRINT TAB 2 - LEN STR$ L;L;")";
340 FOR C = CS TO CE
350 LET D = INT (T(L,C)*100 + 0.5)/100
360 LET A$ = STR$ (INT(100*(ABS
D - INT ABS D) + 0.5)/100) + "0"
370 LET A$ = ("." + A$ AND A$(1 TO
2) = "00") + A$ AND A$(1) = ".") + A$(2
TO) AND A$(1 TO 2) = "0.")
380 LET D$ = (" - " AND D < 0) + STR$
INT ABS D
390 PRINT TAB TB - LEN
D$;D$ + A$(TO 3);
400 LET TB = TB + 7
410 NEXT C
420 NEXT L
```

Diagram 3. Print the table.

```
100 FOR C = 1 TO 4
110 LET T(6,C) = 0
120 FOR L = 1 TO 5
130 LET T(6,C) = T(6,C) + T(L,C)
140 NEXT L
150 NEXT C
```

Diagram 4. To add each column.

IF T(L,C) = 5.826

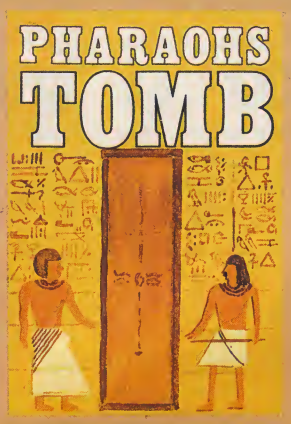
STEP	OPERATION	RESULT
1	MULT BY 100	582.6
2	ADD + 0.5	583.1
3	INT	583
4	DIV BY 100	5.83

Diagram 5. Rounding to two decimal places using 350 LET D = INT(T(L,C)*100 + 0.5)/100.

48K ZX SPECTRUM ADVENTURES – PICTURE GRAPHICS AND COLOUR



You are a Knight of Camelot, searching for Merlin's lost treasure. On your way you will discover the Witches' Tower, rescue a Princess held by the wicked Wizard of Trill. **£5.95**



You discover the entrance to an ancient pyramid blocked by a rock. Once inside, you discover fire rooms, ice rooms and other traps set by the builders to protect the Pharaoh. **£4.95**

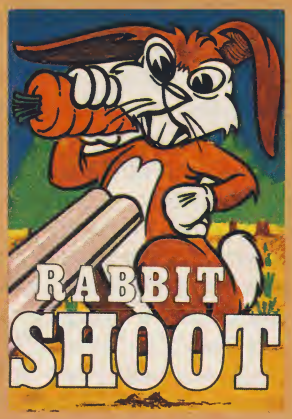


A rope above a rock fissure is the only way into this Magic Mountain, or is it? Legends tell of vast stores of treasure but also of poisonous spiders, lizards and magic at work. **£4.95**



An old deserted mining town holds the clues to the location of a lost gold mine. Once in the mine, your problems are not over – the roof creaks alarmingly and might cave in. **£4.95**

16K ZX SPECTRUM GAMES AND PUZZLES



It is nearly dawn, you are poaching rabbits in a field of carrots. See how many you can bag undetected by the game keeper. Highly original arcade style game. **£4.95**



The cassette of the book. Contains six games (including Castle Walls, Great Fire of London, Reversi) machine code assembler, disassembler. **£5.95** Book available separately **£6.50**



The traditional game with superb screen presentation. Score points by making the two ends add to a multiple of five or three. The first one to reach 72 points wins. **£4.95**



The computer breaks and shuffles a two by two coloured square, whilst you watch the moves it makes. You must then unscramble it to reassemble the original squares. Machine coded. **£4.95**

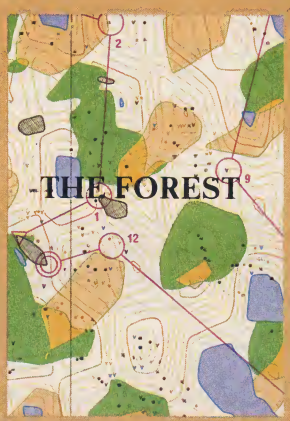
48K ZX SPECTRUM GAMES



To find the Black Planet you need 7 pieces of the key each hidden on different planets, and needing different puzzles to be solved. On the way, you fight off the pirates who get steadily more desperate. **£5.95**



You are Spectrasses, battling in the arena with Gorgon, whose stare can turn you to stone. To recover the lost chalice, you must also win a swordfight with Grang, inside his cave. **£4.95**



Three dimensional simulation of the sport of orienteering. Display is continuously updated as you run. Ideal for map reading practice. Instructions, colour map and cassette. **£9.95**

16K ZX81



For the ZX81, three adventures – black and white text. Magic Mountain, Pharaoh's Tomb, Greedy Gulch, as described above. Superb value for money. **£5.00**

PHIPPS ASSOCIATES

Dept G FREEPOST EM463 (No stamp)
172 Kingston Road, Ewell, Surrey KT19 0BR
Telephone 01-393 0283. 24 Hour answering.

Prices include postage (outside Europe add £1.00 per item). *Access and Visa cards welcome*

PIT YOUR WITS AGAINST THE



In the vast, unexplored regions of outer space, a dot appears on your scanner screen. Suddenly, you are surrounded by enemy fighters. Too late to turn back, you prepare for combat. Your trembling finger reaches for your fire laser button. Who are these fighters out to zap you? Will you live long enough to find out?

Please write quantity of each game required in the boxes provided. Please state computer.

*Cheque for total amount enclosed £ _____

*Access/Barclaycard No. _____

Name _____

Address _____

*Please delete or complete as applicable.

1	**Dimension Destructors** 48K Spectrum £5.95	
2	**Galaxians** 16K/48K Spectrum £4.95. 16K ZX81 £3.95	
3	**3D Combat Zone** 48K Spectrum £5.95	

Try these other mind-blowing games from Artic.
3D Combat Zone – the real 3D tank battle game.
Galaxians – classic arcade action with nine levels of play.



To: ARTIC COMPUTING LTD, Main Street, Brandesburton, Driffield YO25 8RG.

artic Computing Ltd

FOX ELECTRONICS
ZX SPECTRUM 32K UPGRADE



16K to 48K

Reviewed in August Sinclair User as the "best value for money kit" available on the market.

ONLY
£20.99
(inclusive)

THE KIT WITH:

- No soldering required
- Detailed fitting instructions
- 16-minute test program
- Full 48K memory
- 14-day money back guarantee
- 12-month guarantee

THE KIT THAT'S QUICK TO FIT!

AT LAST A KEYBOARD WITH A SPACE BAR

AVAILABLE NOW

ONLY
£39.95
(inclusive)



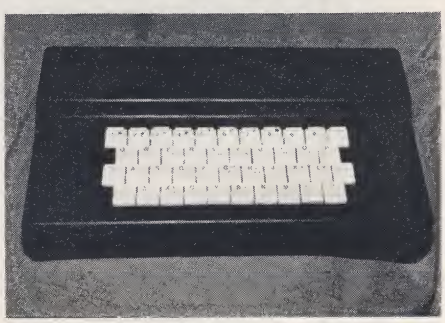
The New FDS for the Spectrum and ZX-81

- Elegant desk-top system
- Designed for professional user
- Slimline case
- Contains all graphic characters for Spectrum and ZX-81
- Additional function keys and **SPACE BAR**
- Easy to install—no soldering required

OR . . . WITHOUT THE SPACE BAR £29.95

The FD42 keyboard for the Spectrum and ZX-81

- long a bestseller
- Sturdy, attractive case, made of ABS plastic
- Makes your Spectrum or ZX-81 into a professional unit
- 42-key keyboard
- Provides Spectrum or ZX-81 graphic characters
- Full travel keyswitches with gold plated contacts, guaranteed for 10^6 operations
- Simple to install—no soldering required





FOX ELECTRONICS

141 ABBEY ROAD, BASINGSTOKE, HANTS, RG21 9ED. Tel: (0256) 20671

SPECTRUM QUICKSHOT JOYSTICK ONLY £19.99

+**85p P&P** including INTERFACE

- Interfaced to plug straight into your Spectrum
- Full instructions
- 8-way movement
- Compatible with more software than ever!!

ECHO FOR YOUR SPECTRUM



£19.95
(Inclusive)

- Better sound
- Control volume
- Adjust tone
- LOAD and SAVE without switching leads
- Audible cue facility for tape programs
- DIN compatible
- No additional power supply required
- Attractive case—looks good, **SOUNDS GOOD!**

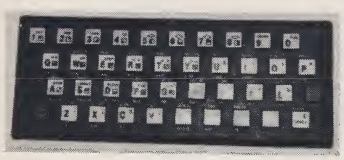
ZX-81 HARDWARE



PANDA: only £19.95
The famous Panda expandable RAM pack.

- 16K add-on memory
- 12-month guarantee

EXPANSION MODULE: expands 16K Panda to 32K **£14.50**



PRESS-ON BUTTONSET KEYBOARD: calculator-type feel **£9.95**

Plese send SAE for full catalogue. Callers welcome by appointment, 24-hour answering machine service.

THE NEW! FOX SPECTRUM PROGRAMMABLE JOYSTICK INTERFACE

The very latest in electronic development: a joystick interface with:

- Complete compatibility with all software
- Proven compatability with the Microdrive
- Rigid black plastic housing which simply plugs into rear part of Spectrum—no trailing leads
- Rear edge connector for further expansion of your system
- In-built memory storage of keys for 16 different games
- Back-up batteries for complete memory storage after power-off. **NO NEED TO RE-PROGRAM EACH TIME.**
- Trickle charged battery system—batteries are recharged whilst in use.
- Full menu of joystick functions at power on.
- Room in memory for personal toolkit.
- Compatible with all replacement keyboards, eg Fuller, FD42.
- Compatible with all Atari type joystick, eg Quickshot, Competition Pro, etc.

SPECIAL OFFER UNTIL CHISTMAS — Fox Spectrum programmable interface and Quickshot joystick (as illustrated) £37.00 inclusive.

Unlike many other makes, the interface is programmed directly from the keyboard—no loading of tapes or lead connections necessary. Once programmed, the unit will store the information as long as it is required. Once again from Fox, the lastest design at the best price—only **£28.50** inclusive.

ALL PRICES ARE INCLUSIVE OF VAT. OVERSEAS CUSTOMERS PLEASE ADD £3.50 POSTAGE & PACKING

Please supply the following.

Spectrum Upgrade £	Master Unit £
Spectrum/ZX-81 FDS £.....	Spectrum Echo £
Spectrum/ZX-81 FD42 £	16K Panda £
Spectrum Joystick £	16K Module £
Programmable Interface £.....	Interface & Joystick £

I enclose Cheque/P.O. payable to Fox Electronics total £.....
or debit my Visa card ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐
Name _____
Address _____

JET PAC –
16/48K ZX Spectrum or 8K Expanded VIC 20

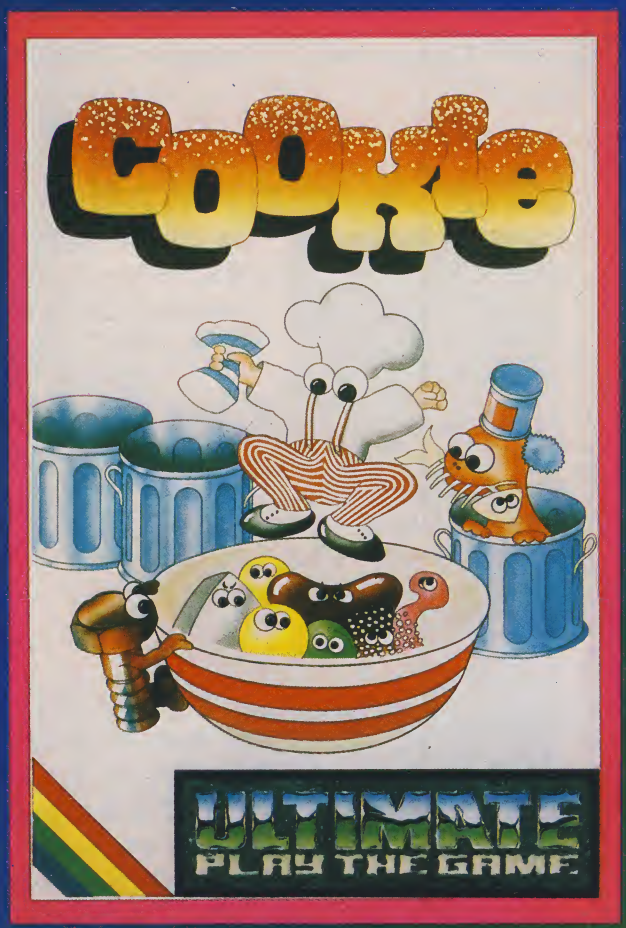


PSSST –
19/48K ZX Spectrum





TRANZ AM –
16/48L ZX Spectrum



COOKIE –
16/48K ZX Spectrum

LUNAR JETMAN –
48K ZX Spectrum



LUNAR JETMAN – For the **48K Sinclair ZX Spectrum.**

LUNAR JETMAN – The **ULTIMATE** Intergalactic **G.A.S. (Graphic Arcade Simulation)** Adventure Space Battle.

LUNAR JETMAN – Arcade standard, 100% machine code, incredible sound effects, amazing smooth high resolution graphics, the totally new addictive concept and all those extra features you expect from the **ULTIMATE** games people.

Design – The **ULTIMATE PLAY THE GAME** design team.

ATIC ATAC – For the **48K Sinclair ZX Spectrum**

ATIC ATAC – The super spooky 3D horror **G.A.S. (Graphic Arcade Simulation)** Adventure game.

ATIC ATAC – Arcade standard, 100% machine code, incredible sound effects, amazing smooth high resolution graphics, the totally new addictive concept and all those extra features you expect from the **ULTIMATE** games people.

Design – The **ULTIMATE PLAY THE GAME** design team.

£5.50 each, including VAT, first class postage and packing within UK.

These games should be available from **W. H. SMITHS, BOOTS, JOHN MENZIES, LASKYS, SPECTRUM CENTRES,** other **large department stores** and all **good major software retailers.** Alternatively, send the coupon to **ULTIMATE PLAY THE GAME** for immediate dispatch by return, subject to availability.

Dealer enquiries welcome, Phone (0530) 411485

ULTIMATE PLAY THE GAME is a Trade name of Ashby Computers & Graphics Ltd., The Green, Ashby de la Zouch, Leics. LE6 5JU.



ATIC ATAC –
48K ZX Spectrum

Post this coupon to:
ULTIMATE PLAY THE GAME, The Green, Ashby de la Zouch, Leicestershire LE6 5JU.
Please rush me the following:

- ☐ LUNAR JETMAN
- ☐ TRANZ AM
- ☐ COOKIE
- ☐ JET PAC
- ☐ ATIC ATAC
- ☐ PSSST
- ☐ JET PAC (8K Expanded VIC 20)

I enclose cheque/PO for £

Name.....

Address.....

.....

Post Code.....

Returning to basics helps solve problems

Andrew Hewson tackles some misconceptions

READERS will be aware that I use letters I receive as the basis for an article on a given topic rather than restricting myself to direct answers to each question posed. I use the approach principally to make the column interesting to all readers rather than the few who may share a particular problem with a particular correspondent. As a result, more than a single sentence from each letter is rarely published.

Recently I have become aware from reading a number of letters again that the questions posed are often based on a misconception of one kind or another, even to the extent that the fundamental question does not exist. It is difficult to answer such letters without publishing them more or less in full. To illustrate the point, consider the following from Larry Simpson of Mansfield. He writes:

I gained the impression from reading about machine code that it was an improvement on Basic partly because hex numbers were used which were more closely related to the binary system of the computer. If so, why do you recommend the use of a hex loader program whose only purpose appears to be to convert hex code back into decimal and poke it into memory?

In attempting to answer the question I feel like the man who, when asked the directions to a particular town, replied "If I were going there I wouldn't start from here". In the same way I cannot tackle Simpson's question without backtracking and correcting some of his ideas.



● *Please address problems and queries to Andrew Hewson, Helpline, Graham Close, Blewbury, Oxfordshire.*

First, it is not correct to say that machine code is an improvement on Basic. I would prefer to say that some tasks can be undertaken by programs written in machine code which could not be undertaken by a Basic program or, if they could, they would be too slow to be satisfactory. Thus it is necessary sometimes to resort to machine language to complete a specific programming task. Writing machine code programs, however, is a skilful and time-consuming process; nobody in his right mind would choose to write a routine in machine language if a Basic routine could do the same job at an acceptable speed.

Second, the difference between Basic and machine language has little to do with the difference between hexadecimal and decimal. In Sinclair computers a Basic program is interpreted each and every time it is executed. In other words, each program line is analysed by the routines in ROM to work out the exact form of each command and then the command is executed.

A machine language program, in contrast, is not analysed at all by the ROM routines, although the program may make use of ROM routines for its own purposes; rather the form of the machine language is such that it drives the microprocessor at the heart of the computer directly.

It is as if the analytical capabilities of the ROM routines which form the Basic interpreter are a very crude imitation of those of the human brain. When a soldier on parade is given the command Forward March his brain interprets the command and despatches a complex sequence of electrical impulses to the muscles of his arms and legs which cause them to contract and relax in such a way as to drive his body forward in the required fashion. The electrical impulses form the "machine code routines" which drive his muscles.

In principle it would be possible to mimic those impulses artificially and, given sufficient surgical skill, to direct them into the soldier's spinal column so that he could be made to walk involuntarily without his brain performing its usual interpretive function.

Finally, I do not recommend the routine use of the simple loader programs which I have included in the column from time to time. Their purpose is to enable all readers to load and try the machine code routines which also appear in the column. Simpson is

Decimal	Assembler Code	Comment
42 101 92	LD HL, (STKEND)	Load HL with the address of the beginning of free memory
235	EX DE,HL	Transfer the value to DE
38 0	LD HL,0	Clear HL
57	*ADD* HL,SP	*Add the address of* the end of free memory into HL
237 82	SBC HL,DE	Subtract DE from HL
68	LD B,H	Transfer the result to
77	LD C,L	the BC register pair
201	RET	Return to Basic

Table 1. A ZX-81 program to calculate the current amount of remaining free memory.

```
10 REM Space for machine code routine —
at least 65 characters
20 FOR I=16514 TO 16614
30 INPUT A
40 IF A<0 OR A>255 THEN STOP
50 POKE I,A
60 PRINT I,A
70 NEXT I
```

Table 2. A decimal loader program for the ZX-81. The REM statement at line 10 is essential. The contents of the REM statements will have changed after the program is executed.

```
10 LET I=PEEK 16396+256*PEEK
16397
20 LET J=PEEK 16400+256*PEEK
16401
30 PRINT "ENTER THE CHARACTER
TO BE DELETED"
40 INPUT Z$
50 LET Z=CODE Z$
60 FOR K=I TO J-1
70 IF PEEK K=Z THEN POKE K,0
80 NEXT K
```

Table 3. A ZX-81 routine to delete selectively a character entered by the user from the ZX-81 display.

correct in one respect — their only function is to POKE numbers, in decimal or hexadecimal as appropriate, into locations in memory, because it is those numbers which cause the microprocessor to perform the required task.

Where can I find the addresses of the Spectrum ROM routines and can you explain how to use them? asks Michael Dobson of Barrow-in-Furness. The most comprehensive sources of information are the books by Dr Ian Logan, *The Complete Spectrum ROM Disassembly* and *Sinclair ZX-81 ROM Disassembly,* parts A and B. The books list the entire contents of the appropriate ROM with a certain amount of information on the action of each section of code.

They are unsuitable for a beginner because a great deal of material concerning the operation of the Z-80 processor is taken for granted. Hence I would suggest that the average reader starts with one of the many introductory books on assembly language programming which usually contain information on some of the routines.

Jean-Hugues Belpois of Besançon, France requests information on such a routine. He writes: **Can you publish a routine which will print the amount of free memory remaining for use on a Spectrum?**

It is not necessary for me to offer such a routine for the Spectrum because a similar one already exists in ROM at address 7962. The routine returns, via the BC register pair, the amount of ROM and RAM already in use on the 48K machine — or the amount plus 32768 on the 16K machine. Hence to use the routine on both the 16K and the 48K machine enter: PRINT 65536 — USR 7962

The ZX-81 ROM does not contain the equivalent routine, so I have shown an alternative in table one. The routine can be loaded with the inevitable decimal loader listed in table two. To call the routine enter:

PRINT USR 16514

Steven Neal of Stratford-upon-Avon asks an interesting question. He writes: **How can specific characters be removed from the screen on the ZX-81 while leaving the bulk of the display intact?** The solution to the problem is straightforward. In essence, it is necessary to scan through the display file, testing each location to see if it contains the code of the character to be deleted. If it does, then POKE zero — i.e., the code for a blank — into the location. The display file lies in the area in memory between the addresses pointed to by the DFILE and VARS systems variables. Those two variables are held at 16396 and 16400 respectively. A suitable Basic program is listed in table three.

That type of routine can be used to tidy the ZX-81 display when successive calculations are being performed. In those situations an annoying problem can arise when the PRINT AT command is used to over-write the result of a previous calculation with a new value, because the command does not necessarily cover the result completely. For example, if 3.333333 is over-written by 4.5 the display will show 4.533333, which is very misleading.

Clearly a routine which deletes all numbers from the display selectively is required. The routine must also be capable of detecting and deleting a decimal point embedded in a number and the presence of a number in scientific notation, e.g., 130,000,000 which is PRINTed as 1.3 E 8. The machine code routine listed in table four performs all those functions.

I wrote a machine code routine to undertake the task because a Basic program would have been too slow to be satisfactory. The routine illustrates the speed of machine code; when it is used digits on the screen disappear quickly.

Unfortunately it is not possible to write an equivalent routine for the Spectrum, because the display is handled in a different fashion.

The Basic program in table five illustrates the technique. The first loop PRINTS the letters in blue INK on white PAPER and the numbers in black INK on white PAPER. The attribute value of the black/white combination is 57. Hence the second loop searches the attribute file, locating the bytes which contain 57. When such a location is found its contents are changed to 63.

Finally, an apology. I write the column using a word processor package on a microcomputer. Unfortunately the printing head of the printer I use does not have a greater than or a less than sign, so I add those characters by hand before the manuscript is despatched to the editor. Unfortunately I forgot to do so for the column which appeared in the August issue. Hence lines 50 and 60 of the Basic program in table three of that issue should in each case contain a greater than sign immediately before the 57.

Decimal	Assembler	Comment
237 75 12	LD	Load BC with
64	BC,(16396)	address of beginning of display file
42 16 40	LD HL,(16400)	Load HL with address of end of display file
167	AND A	
237 66	SBC HL,BC	Calculate length of display file
68	LD B,H	Transfer result
77	LD C,L	to BC register pair
42 12 64	LD HL,(16396)	Load HL with address of beginning of display file
126	LD A,(HL)	Beginning of main loop — copy byte pointed to by HL to A
254 38	CP 38	Jump if greater than or equal to 38 (one
242 184 64	JP P,16568	greater than the code for 9)
254 28	CP 28	Jump if less than 28
250 184 64	JP M,16568	(the code for 0)
54 0	LD (HL),0	Byte contains a digit hence over-write
35	INC HL	Increment HL
126	LD A,(HL)	Copy byte to A register
254 42	CP 42	Jump if not equal to 42
32 2	JR NZ,2	(the code for E)
54 0	LD (HL),0	Byte contains E hence over-write
43	DEC HL	Decrement HL
43	DEC HL	Decrement HL
126	LD A,(HL)	Copy byte to HL
254 21	CP 21	Jump if equal to 21
40 8	JR Z,8	(the code for+)
254 22	CP 22	Jump if equal to 22
40 4	JR Z,4	(the code for −)
254 27	CP 27	Jump if not equal to 27
32 2	JR NZ,2	(the code for .)
54 0	LD (HL),0	Byte contains +,− or . hence over-write
35	INC HL	Increment HL
35	INC HL	Increment HL
11	DEC BC	Decrement length of display counter
62 0	LD A,0	If remaining length
184	CP B	of display
32 210	JR NZ,-46	is not zero
185	CP C	then jump to
32 207	JR NZ,-49	beginning of main loop
201	RET	Return to Basic

Table 4. A machine code program to delete all numbers appearing on the ZX-81 display. The program must be loaded into a REM statement forming the first line of a Basic program.

```
100 FOR I=1 TO 20
110 PRINT INK 1 ; PAPER 7 ; "ABCDEF
" ;
120 PRINT INK 0 ; PAPER 7 ;
1234.56789
130 NEXT I
140 PAUSE 9999
200 FOR I=22528 TO 23551
210 IF PEEK I=56 THEN POKE I, 63
220 NEXT I
```

Table 5. A Spectrum program which illustrates the technique for clearing digits selectively from the display by manipulating the attributes file.

MICROMEGA

3D



3D

LUNA CRABS

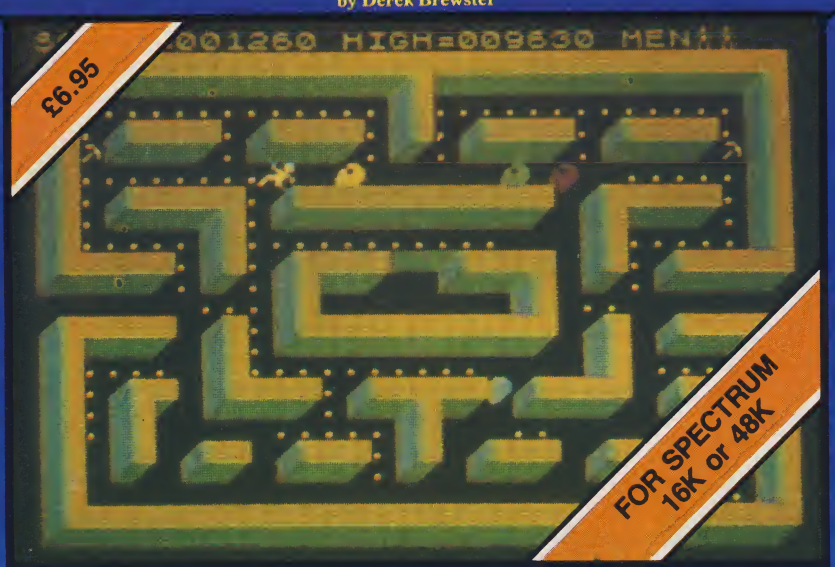
by M J Estcourt

NEW SOFTWARE FOR A NEW DIMENSION
The Graphics Tell The Story

HAUNTED HEDGES

by Derek Brewster

3D



3D

AVAILABLE NATIONALLY FROM ALL GOOD RETAILERS

MICROMEGA · PERSONAL COMPUTER DIVISION · QUANTEC SYSTEMS & SOFTWARE LTD · 230 LAVENDER HILL · LONDON SW11 1LE

There are moves towards technical end of market

John Gilbert reviews a new development in publishing but discovers there is still a great deal of room for improvement

WE FORECAST two months ago that books about computers would become more technical towards the end of the year. That has happened but a large gap is still left in that part of the market.

Ian Sinclair's new book, *Inside Your Computer,* is an example. It provides a general introduction to what a computer is made of and how it functions but offers little new information. The author was accurate to describe it as being aimed at beginners, because it could not be recommended to anyone who has had a computer for more than six months and has read any computer magazines.

Although it is a simplistic introduction there is little wrong with what it preaches. Sinclair has taken a diverse set of subjects and put some structure into them. The result is a clear definition of both the hardware and software of a machine.

The author refers to specific machines several times but that is not often sufficient. The ZX-81 and Spectrum are dragged into the explanations twice but some of Sinclair's descriptions are difficult to understand because one cannot visualise the machine he is explaining. The book compensates for that deficiency to some degree, however, with photographs and diagrams. For a technical book for the beginner there are too few illustrations, although those which are included provide some degree of expansion and enlightenment on the text.

On the whole the book is disappointing, because from the taster on the back and the picture on the front the reader could be led to expect more. It can be recommended to the complete beginner who has just bought a computer or to someone who has no computer but wishes to know how one works. The book is published by Granada Publishing and costs £4.95.

First Steps With Your Spectrum, by Carolyn Hughes, is another book for beginners dealing only with software. It is published by Armada, a company which specialises in children's products and a first attempt at breaking into the computer field has worked.

The book contains a satisfactory combination of text and illustrations. Unlike many other publications which launch straight into an explanation of a computer language and how to use it,



the author takes time to explain what a computer can do and why it would be useful.

Written in a style anyone should understand, the book would be equally useful to an adult who knows nothing about computers but wants to learn.

The author has included several programs designed specially with beginners in mind. Some of them, such as the fruit machine, are predictable but others, such as Elephant, where you have to build an elephant, and Morse Mole, where you have to find a bleeping rodent, are brilliantly simple and perfect for beginners.

Well worth recommending, it can be obtained from Armada Original Publishing and costs £1.25.

Spectrum Adventures, by Tony Bridge and Roy Carnell, is a sight for sore eyes and it also fills a very important gap in the computer book market. It fulfils two functions. First it provides a guide to playing adventure games. It gives a general history of adventure gaming and provides details of some of the major adventure games available on the Spectrum, including The Hobbit and the adventures A, B, C and D from Artic Computing. That part of the book provides some good tips for the old and new adventurer alike, without revealing too much.

The second function is to show how an adventure game is written. The example, The Eye of the Star Warrior, was written by Carnell, who also wrote the Black Crystal and, like its counterpart, it is a graphics adventure.

The book provides a wealth of information for anyone interested in dungeons and dragons. Its authors have made the book interesting and exciting and have provided a complete text book for that aspect of software. It can be obtained from Sunshine Publications for £5.95.

Just as esoteric but much more complicated is *Z-80 Machine Code for Humans* by Alan Tootill and David Barrow. The title is unfortunate as the book seems to be a regurgitation of others which follow the same lines. It provides concrete examples of what can be done when you and not the Basic operating system control the microprocessor.

The unfortunate aspect is that it is difficult to tell whether it is a machine code trainer or if it is a book for programmers who know how to use the language but do not know what to do with it.

There are several machine code routines in the book, including printing a string of text on the screen all the way up to drawing high-resolution lines.

The book is not machine-specific but most of the routines should work on the Spectrum and some of them on the ZX-81. Any reader, however, should make some allowance for the fact that Sinclair machines use a Z-80A processor and not the Z-80. In most cases there is little difference but you should be careful to check.

Granada Publishing, PO Box 9, Frogmore, St Albans, Hertfordshire, AL2 2NF.

Armada by Fontana Books, 8 Grafton Street, London, W1X 3LA.

Puffin Books, Penguin Books Ltd, Harmondsworth, Middlesex.

Sunshine Publishing, 12–13 Little Newport Street, London WC2R 3LD.

The Hobbit. Now the best is a

"After a very short time I found that 'The Hobbit' was becoming almost a way of life rather than a game, and so when I finished it for the first time I was partly sad because I felt that all the fun and adventure had ended, but I was wrong. Even now I am discovering new things about the game and feel that it will be some time until all of its secrets are revealed to me."

MR. J. STERN, Herts

"I have at last received your 'Hobbit' program and would like to congratulate you on its excellence. After four days of sweat and tears I have completed only 37.5 per cent of the adventure. The program has lived up completely to expectations, and there is no doubt about it being the best production for the Spectrum to date. You have surpassed all others with this program."

"A lot of fun."

COMPUTI

"The excellent gra
The exciting differ
is that it is possibl
converse with all t
meet and ask their
recommend this g
Tolkien, or novel a

POPULAR COMP

"I am writing to co
'Hobbit'. I think it is one of
ingenious programs I have h
to use. It has kept me stump
months. I think the effort th has go
writing a program like this must have be
enormous. The effects are brilliant to say th
least."

JEREMY CHESTER

"T bit takes first place in the new
quality and value for money."

SINCLAIR USER

cations in the Adventure are
e excellent graphics. We
plete 7.5 of

ures. The
ed plot
erior to any
for the

COMPUTER

misty Mountains
, this game is
eat to play and is No. 1 for
nd excitement."

GORDON DEMPTSTER, Scotland

"Thanks again for an excellent game in 'The Hobbit'. I feel I have really got my money's worth out of playing time. Congratulations!"

MR. P. RUSHTON, Leeds

"The most powerful computer game yet invented."

COMPUTER WEEKLY

"Within my circle of friends this game has become something of an obsession. We meet every Friday night at someone's house and spend 3-4 hours on 'The Hobbit'. Friday night would not be the same without 'The Hobbit'."

CHRISTINE VERCHILD, Wilts

"One new Adventure game stands head and shoulders above the rest. It alone almost provides you with a good enough reason to buy a 48K Sinclair Spectrum. Not only does The Hobbit produce drawings of the main scenes, but it also understands proper sentences rather than pairs of words for its commands. It comes with a copy of J.R.R. Tolkien's classic book of the same name. It is the program with the most detailed and best written documentation ever."

WHAT MICRO

"This is an impressively packaged Adventure game which makes good use of the Spectrum's colour graphics. They have not only produced one of the best games for the Spectrum, but given everyone else a lesson in good game design."

PRACTICAL COM

"I am the owner of a copy of 'The Hobbit' which is wonderful entertainment, and very challenging. I have other tapes and publications of yours, all of which are excellent."

MR. D.J. BURGH, Kent

"Having received the most excellent piece of programming I have ever seen, we have had no social life whatsoever. 'The Hobbit' has been dominating our lives since January and many nights have been spent until 3 o'clock trying to conquer it."

SIMON ROGERS, Avon

"I have recently purchased your excellent adventure game 'The Hobbit'. This greatly enhanced by the use of graphics, its availability in of having to



Melbourne House

s available for:

SPECTRUM
COMMODORE 64
ORIC 1
BBC



"In my software library, your program 'The Hobbit' takes first place."
DAVID MAXWELL, London

"I am the proud owner of your excellent program 'The Hobbit' and have alre many happy, restful, relaxing hours trying to solve its

...tulate you on a ... I have enjoyed ...mensely. I must thank you ...oducing such a clever product, it was worth every penny of the purchase price."
MRS. J. RYCRAFT, Northampton

...d for my ZX ...you supply called ...n excellent ...the money. I find ...ery realistic. The ...accurate. It sticks ...e book, which is a ...it very compelling ...tive."
...VEN CASSIDY, Essex

...ving recently purchased a Sinclair Sp...trum I decided to buy 'The Hobbit' sinc... I have been doing a literature project based on 'The Hobbit' with my class of 10 and 11 year old children. Over the last 10 weeks the children, having read the book, have been attempting the program with my assistance. Let me congratulate you on a most entertaining program."
MR. K. REID AND CLASS 7, Nottingham

... more of an experience than a program!"
POPULAR COMPUTING WEEKLY

"... the most unique factor of this program is that the user instructs the computer in completely ordinary English sentences. The Hobbit program is capable of very sophisticated communications ..."
ZX COMPUTING

"I purchased 'The Hobbit' not long ago and since then I have been engrossed in the game, and I'm beginning to think no-one wants to talk to me as all I talk about is my adventures in, 'The Hobbit'."
DAVID ROWLEY, Stoke-on-Trent

"The use of graphics is one of the features which makes The Hobbit special. The addition of graphics as good as these adds a whole new dimension to the Adventure. It is certainly a marvellous game, which should set the standard for future Spectrum adventures."
ZX COMPUTING

"**'The Hobbit' is a beautifully constructed, frantically-maddening, tortuous, gloriously inconsistent, thoroughly spooky adventure – far better than I could have hoped for and certainly the finest of the dozen or so adventure programs I have. In short, I congratulate the four who sweated for a year and a half to concoct such a super result.**"
MR. PETER JONES, South Glam

"**Nothing is certain in this Adventure, but uncertainty! Add to this the brilliant graphics that are used to describe many of the locations and we have an Adventure that is going to become a classic for the Spectrum.**"
POPULAR COMPUTING WEEKLY

"**I am writing to congratulate you on your excellent program 'The Hobbit' for the Spectrum. I wake up in the middle of the night with an idea and have to load the adventure to try it out.**"
MR. PHILLIP DARLING, Suffolk

"**A most impressive package.**"
DAILY EXPRESS

"**...we are not eating food...we are losing sleep...and it's great! I reckon you can guess why. We are lost, completely and utterly lost, in the Hobbit program.**"
MR. JOHN HARRIS, Kuwait

"**...one of the most complex games for the Sinclair machines I have seen...**"
SINCLAIR USER

Orders to:
Melbourne House Publishers
131 Trafalgar Road
Greenwich, London SE10

Correspondence to:
Melbourne House,
Tring,
Hertfordshire

All Melbourne House cassette software is unconditionally guaranteed against malfunction.

Trade enquiries welcome.

☐ Please send me your free 48 page catalogue.
Please send me:

SPECTRUM
- ☐ Spectrum "The Hobbit" 48K £14.95
- ☐ Penetrator 48K £6.95
- ☐ Terror-Daktil 4D 48K £6.95
- ☐ Melbourne Draw £8.95
- ☐ H.U.R.G. £14.95
- ☐ Abersoft Forth £14.95
- ☐ Computer Bridge £8.95

COMMODORE 64
- ☐ Commodore 64 "The Hobbit" £14.95
- ☐ Commodore 64 Hungry Horace £5.95

DRAGON 32
- ☐ Dragon 32 Hungry Horace £5.95

BBC
- ☐ BBC "The Hobbit" £14.95

ORIC 1
- ☐ Oric 1 "The Hobbit" 48K £14.95

All versions of "The Hobbit" are identical with regard to the adventure program. Due to memory limitations, BBC cassette version does not include graphics.

£

Please add 80p for post and pack £ .80

TOTAL £

I enclose my ☐ cheque
☐ money order for £

Please debit my Access card No.

.....

Expiry Date

Signature

Name

Address

.....

.....

..... Postcode

Access orders can be telephoned through on our 24-hour ansafone (01) 858 7397.

SU11A

FOR YOUR NEAREST

Fuller MICRO SYSTEMS

DEALER

SOUTH

RGR Electronics Education Distributors
'Eversley' High Street Bradsted Kent TN16 1JJ
Fox Electronics
141 Abbey Road Basingstoke Tel: 0256 20671
Vision Store Ltd
3 Eden Walk Kingston Upon Thames Surrey KT1 1BP Tel: 01 546 8974Datastore 6 Chatterton Road Bromley Kent Tel: 01 460 8991
Canterbury Software Centre
9 the Friars Canterbury Kent CT1 2AS Tel: 0227 53531
Bury Computer Centre
11 Guildhall Street Bury St Edmonds Suffolk 1P33 1PR Tel: 0284 705772
Lion Micro Computers
Lion House 227 Tottenham Court Road London W1P 0HX Tel: 01 580 7383
SPI Soundvision
359 Greenlanes Palmers Green London N13 Tel: 01 882 5888
Quids In
38 North Street Romford Essex Tel: 0708 26840
Rush Hi-Fi Centre
5/6 Cornhill Chelmsford Essex Tel: 0245 57593
Swansey Electronics
32 Goldsel Road Swanley
The Data Store Microcomputers
6 Chatterton Road Bromley Kent BR2 9QN Tel: 01 460 8991
The Micro Workshop
12 Station Approach Epsom Surrey KT19 8ES Tel: 03727 21533
Enfield Communications Ltd.
135 High Street Ponders End Enfield Middlesex EN3 4EB Tel: 01 805 7434
JCV Hi-Fi & Video Ltd
Wharf Street Warrick Warrickshire Tel: 0926 493796
Metyclean Ltd. 92 Victoria Street London SW1E 5JP Tel: 01 828 2511
Breaks One Four
130 High Street Edgware Middlesex Tel: 01 952 7488
Square Deal
375 Footscray Road New Eltham London SE9 2DR Tel: 01 859 1516
Buffer Micro
310 Streatham High Road London SW16 Tel: 01 769 2887
Channel One Computer Services
174 High Street Hornchurch Essex
Computersolve Ltd.
8 Central Parade St. Marks Hill Surbiton, Surrey KT6 4PJ Tel: 01 390 5135
Alphascan Ltd.
Little Bourton House Southam Road Banbury, Oxon OX16 7SR Tel: 0295 75606
Computer Corner
261 Commercial Road Portsmouth Tel: 0705 833938
Videola
535 Green Lanes Harringay London N.8 Tel: 01 340 3432
Chelsea Micros Ltd.
14 Jerdan Place Fulham London SW Tel: 01 385 8494
Radford Hi-Fi
43 King Edward Court Windsor Berks
Bartletts Hi-Fi & Video
175/177 Holloway Road London N7 Tel: 01 607 2296
Worthing Computer Centre
32 Liverpool Road Worthing West Sussex BN11 1SZ Tel: 0903 210861
Sutton Home Computer Centre
39 Benhill Road Sutton Surrey Tel:01 642 2869
Spectrum U.K. Ltd.
Burrowfield Welwyn Garden City Herts AL7 4SS For nearest dealer Tel: 07073 34761

SOUTH WEST

Brensal Computers Ltd.
24 Park Row Bristol Tel: 0272 294188
Screen Scene
144 St Georges Road Cheltham Gloucestershire Tel: 0242 28979
Westfarthing Computer Systems
21 Wendron Street Helston Cornwall Tel: 03265 4098
Radford Hi-Fi
52-54 Gloucester Road Bristol Tel:0272 40878
Computervision
4 Market Street St. Austell PL25 4BB Tel: 0726 5297

SCOTLAND

ITEC
Unit 6 13A Harbour Road Inverness IVI 1SY Tel: 0463 226505
Micro Shack
18 Chapel Street Aberdeen Scotland Tel: 0224 636081
Alan R Foulis
12 Richmond Gardens Chryston Glasgow G69 9PA Tel: 041 779 1444
Tomorrow's World
Esplanade Lerwick Shetland ZE1 0LL Tel: 0595 2145
John Menzies Ltd
107 Princes Street Edinburgh Scotland EH2 2YQ
Certain stores only

EUROPEAN DEALERS

CT Data & Elektronik
Alrovej 168 8300 Odder Denmark Tel: 010456551655
Westmoen Data-Elektronik
P.O. Box 359 4581 Lyngdal Norway Tel: 043 43165
Arild Westmoen
Rush Records Duesseldorf West Germany Tel: 8586288 Rush D
Aashima Trading Groenendaal 53 3oll SH Rotterdam Netherlands Tel: 010 141110

NORTH WEST

Diskwise Computer Centres Ltd
68/70 Lower Hillgate Stockport Cheshire SK1 3AL Tel: 061 480 4422
Micro-Tronics
27a Market Street Tamworth Staffs Tel: 0827 51480
Bill Ginty's
9 Bekmont Road Bolton Lancs Tel: 0204 56331
Home Computer Centre
Acme Hire Ltd. 40 King Street Blackburn Lancs Tel: 0254 671316
4-Mat Computing
67 Friargate Preston Lancs PR1 2AT Tel: 0772 561952
Leigh Colour Laboratory Ltd.
87 Chapel Street Leigh Lancs Tel: 0942 607661
Beaver Radio Ltd
20-24 Whitechapel Liverpool L1 6EH Tel: 051 709 9898
Deltar Micros Ltd
The Computer Centre 68 Chestergate Macclesfield Tel: 0625 618827
Pase
213-215 Market Street Hyde Cheshire SK14 1HF Tel: 061 366 5935
Goodrights Ltd
1 Friargate Preston Lancs PR1 2AU Tel: 0772 57528
Dever Microcomputers
21 St Werburgh Street Chester Tel: 0244 316 516
Midshire Computer Services
78 Nantwich Road Crewe Cheshire Tel: 0270 211086
Home Business Computers
54 Yorkshire Street Oldham Greater Manchester
Home Computers Ltd
234 Church Street Blackpool FY1 3PX Tel: 0253 22340
Cleartone Hi-Fi
156-158 Blackburn Road Bolton Lancs
Darlington Computer Shop
75 Bondgate Darlington
D.Tec
165 Old Chester Road Bebington Merseyside Tel: 051 645 8382

NORTH EAST

AFDEC Electronics Ltd
318 Kempshott Lane Basingstoke Hants RG22 5LT Tel: 0256 51841
H A S E
54a Town Street Horsforth Leeds LS1 84AP Tel: 0532 585357
Computer Shop
Unit 25 Handyside Arcade Newcastle Upon Tyne NE1 4PZ Tel: 0632 616260
Barrow Computer Centre
96 Church Street Barrow in Furness Cumbria Tel: 0229 38353
Northern Computing
31 Redrock Road Rotherham South Yorkshire S60 3JN Tel: 0709 60000
Just Micro
22 Carver Street Sheffield S1 4FS Tel: 0742 752732
Erricks of Bradford
Fotosonic House Rawson Square Bradford Yorks BD1 SJR Tel: 0274 309 266

MIDLANDS

Microwave
St Peters Lane Leicester Tel: 0533 29023
ENL Audio Visual Ltd
116-118 Alfreton Road Nottingham Tel: 0602 784015
Datel Electronics
27 Hope Street Hanley Stoke on Trent Tel: 0782 273815
Computer Cabin
24 The Parade Silverdale Newcastle Under Lyme Staffs Tel: 0782 636911
Harborough Home Computers
7 Church St Market Harborough Leicester Tel: 0858 63056
Richard Reeves Ltd
174 Kettering Road Northampton Tel: 0604 33578
Vision on Video
255a High Street Erdington Birmingham B23 Tel: 021 373 9383
Software City
31 Castlecroft Road Finchfield Wolverhampton West Midlands Tel: 0902 25304
RK Computers
37-38 Second Floor The Siver Arcade Leicester Tel: 0533 532911

EUROPEAN DISTRIBUTORS

Computronic Dizengoff Cntr.
Office 426 PO Box 22680 Tel: AVIV 61226 Israel
Rentina 341730 SPEED il
Arnsvik Data Box 19017 S-250 19 Helsingborg Sweden Tel: 046 42 92229
Ramex International 48945 Vandyke PO Box 50 Utica Mitchegan 48087 USA
Melewar Trading Company Ltd
9th Floor Wisma Central Jalan Apang kuala Lumpar Malaysia
Computer Accessories
78 Hout Street Capetown 8001 South Africa
Mega Ltd
7 Anley Street St Helia Jersey C1 Tel: 0534 72263
Sumus Srl/General Processor
via S Gallo 16/R 50129 Florence Italy Tel: 571034 GEN PR 01
Inelec
110 Bis Avenue Du General Leclerc 93500 Pantin nr. Paris France Tel: 213187

IOM

Aldridge Audio
54 Bucks Road Douglas Isle of Man Tel: 0624 23090

We still have vacancies for Dealers in certain areas, for further information contact us now on 051-236 1899 and ask for our dealer manager Mr. B. Parry

MUSIC GAMES
AND LEARNING AIDS for Spectrum 16K/48K

FIREWORK MUSIC £5*

This is an action-packed educational game which helps beginners to learn note names in the treble and bass clefs. Its features include high-res music displays with fireworks, explosions and thunderstorms, just for fun!

"Firework Music is an ideal teaching aid for young children learning the rudiments of musical theory." . . . Sinclair User, July 1983.

TUNER £5*

How well can you tune a note? Players have to match musical notes sounded by the computer. Playing is like tuning a guitar and is super practice for all musicians—but this is an absorbing and challenging game whether you play an instrument or not. The 4 levels of difficulty range from novice to expert. Sharpen your skill with the 1-player version then flatten your opponent in the 2-player game!

A range of music software for the 16K ZX81 is also available.

Please send s.a.e. for full Spectrum, ZX81 catalogue.

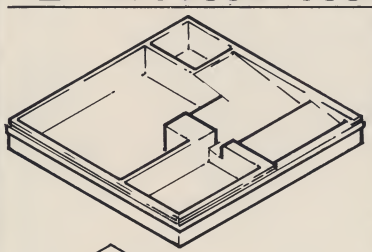
SOFTWARE COTTAGE

19 Westfield Drive, Loughborough, Leics. LE11 3QJ

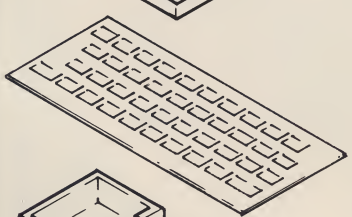
*Cheques, P/Os with orders please—payable to SOFTWARE COTTAGE.
Overseas customers, please add £1 for each item ordered.
Price includes cassette, instruction booklet and P&P.

SPECTRUM PRODUCTS

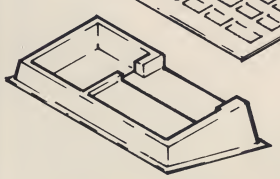
G·CHAPMAN LTD·



MICRO·TIDY·····
Designed for ease of use. Space for SPECTRUM, power·pack, recorder, cassettes, micro·drive or printer. Space at rear of SPECTRUM for add·ons and ZX Interface, complete with lid. ····· £22:45



KEYBOARD·····
OVERLAYS·····
Pack of TEN overlays for the SPECTRUM (plain) size·225×95. ····· £2:20



MICRO·CONSOLE·
Designed for easy use. Space for SPECTRUM and micro·drive or printer. Space to SPECTRUM rear for add.ons and ZX Inteface ····· £7:50
with lid ····· £9:75

SPECTRUM PRODUCTS

Post to G.Chapman.Ltd. Station Road Industrial Estate, Whittlesey, Nr.Peterborough, Cambs. PE7 2EY

MICRO·TIDY ····· £22:45
KEYBOARD OVERLAYS ··· £2:20
MICRO·CONSOLE ····· £7:50
CONSOLE·· ·WITH LID ·· £9:75

Name: _____

Address: _____

All prices include VAT, P&P. Overseas orders add 25% additional mail.

SPECTRUM PRODUCTS

sinclair special 5



Inside... New Interface 2 and ROM cartridges! New Software!

TAKING NEW SOFTWARE IN NEW DIRECTIONS

You'll see that this issue of Sinclair Special devotes considerable space to software. Why, when we've so much to say about hardware and peripherals? Simply because at Sinclair we believe in supporting first-class hardware with first-class software.

This month sees the start of a new commitment to education in our catalogue, both for adults and children.

In the field of micro theory, we've programs like Beyond BASIC and Make-a-Chip, which take you from the creation of simple ZX® assembler subsets to simulated circuit design projects.

There's Musicmaster, to teach you music terminology, note values and composition.

And if you're keen to beat your Spectrum at chess (which can be hard), you'll certainly want to try Chess Tutor 1, the first program in a complete chess masterclass.

Coming soon...

In the pipeline are many new releases, some of which break completely new ground. LOGO and micro-PROLOG for instance. They're fifth generation languages which will take you and your Spectrum closer than ever before to the creation and application of artificial intelligence.

A formal agreement between Sinclair and Macmillan Education has been announced, the first results of which will be published this autumn. These consist of five programs in a complete early reading course plus the first four of a series of programs based on Macmillan's top selling Science Horizons Scheme. All programs are designed for use in schools or the home.

And with Blackboard software, we're publishing six more home education programs for primary school children. Covering alphabet, spelling and punctuation, each of these programs is a true gem, unlike any other education software, and fascinating to run. Even for adults!

I believe that these new titles represent a major advance in educational software for the home.

New ROM software too!

You may well have heard news of ZX Interface 2® and ROM cartridge programs. You'll find full details of the Interface and its software on the facing page (and there's an order form on the back page too!). These offer an instant games playing facility at unbeatable prices, and expand the possibilities of using your Spectrum in yet another direction.

Alison Maguire

Alison Maguire
Applications Software Manager

SOFTWARE UPDATE

The latest cassette software for ZX® Computers



Chess Tutor 1
For 48K RAM Spectrum. **£9.95.**

Chess Tutor is a new way of learning all about chess – using your ZX Spectrum.®

It starts from the beginning by teaching you about the chess pieces and the way they move – including castling, en passant, promotion, check, checkmate, stalemate and perpetual check.

Then it teaches you the basic tactics – pins, forks, double attacks and skewers.

There are over 120 exercises and over 200 questions for you to answer – with demonstrations and hints from your ZX Spectrum when you want them.

You can choose which parts of the course you want – and even experienced players may be surprised at what they can learn from Chess Tutor.

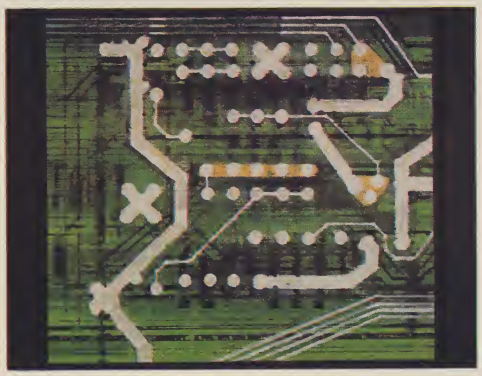


Musicmaster
For 48K RAM Spectrum. **£9.95.**

Musicmaster turns your ZX Spectrum into a musical instrument which will not only play tunes, but will also demonstrate key signatures, durations of notes, and scales.

You can write your own tunes – in any key – play them over and over again, save them on tape, modify them.

You can either write your music on a stave, or place a simple overlay on your Spectrum for a 17-note keyboard.



Make-a-Chip
For 48K RAM Spectrum. **£9.95.**

Make-a-Chip teaches you the basic elements of circuit design, shows you how they fit together, and then lets you design and test your own circuits.

When you have designed a circuit, you can give it inputs and outputs and your ZX Spectrum will check it for you. Then it will run it, or tell you what's wrong so that you can modify it.

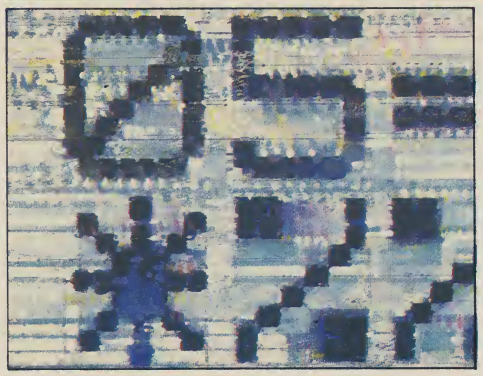
Make-a-Chip is a fascinating way of finding out how computer logic works.



Print Utilities
For 16K and 48K RAM Spectrum. **£9.95.**

Increase the printing and display facilities of your ZX Spectrum with the Print Utilities program.

Print Utilities enables you to enhance your programs by generating characters of eight different sizes which you can place anywhere on your screen.



Beyond BASIC
For 48K RAM Spectrum. **£9.95.**

Takes the agony out of assembler. Takes the mystery out of machine code.

Beyond BASIC gives you a deeper insight into the workings of your ZX Spectrum. It explains what happens inside your micro when you run a program, and it teaches you simple Z80 machine code programming.

A major feature of Beyond BASIC is that it enables you to write your own Z80 assembler programs – then you can actually see on your screen how they affect the ZX Spectrum memory and registers.

ZX INTERFACE 2®

The New ROM Cartridge/Joystick Interface

Loads programs instantly!
Takes two joysticks!
Just plug-in and play!

The ZX Interface 2 is the latest new peripheral for the ZX Spectrum® system. It enables you to use new ZX® ROM cartridge software: plug-in programs that load instantly. It allows you to use two standard joysticks, without the need for separate, special interfaces.

To use new ZX ROM cartridge programs, just connect Interface 2 to the rear of your Spectrum or Interface 1 and plug in the cartridge of your choice. The program is then loaded, ready to run!

You can use any joystick that has a 9-way D plug. Use one or two of them for extra fun with ZX ROM cartridge or Sinclair cassette programs – or with dozens of other Spectrum-compatible programs!



SEE BACK PAGE FOR ZX INTERFACE 2 AND ROM CARTRIDGE ORDER FORM!

...AND BRAND NEW ROM CARTRIDGE SOFTWARE!

There's already plenty of choice of ZX ROM cartridge programs for your Spectrum. Some are old favourites, in an exciting new form. Others are new.

And now, thanks to ROM cartridge technology, you can run them *all* on a 16K RAM Spectrum, even if they were originally written only for 48K machines!

Every ROM cartridge program loads fast and faultlessly. No wires, no waiting, no worries about loading errors! All of them are affordably priced too, at £14.95.

Backgammon



Everything you need to play the famous and deceptively simple board game. Board, stones, rolling dice and doubling dice are shown in full colour and high resolution. Choose from four levels of skill to suit experts and beginners alike – full rules are included.

Space Raiders



Your skill is all that's stopping successive waves of aliens from destroying Earth. Use your gun base to attack. Shelter behind buildings... move out and blast the passing alien soaceship!

Full-colour high-resolution graphics with sound.

New! PSSST



Robbie the Robot sits in his garden. Help him fetch compost to cultivate his prize Thyrgodian Megga Chrysanthodil. Help him make the right choice of pesticide, to ward off devilish insects. Stop the insects breeding to overwhelming numbers before Robbie's plant has bloomed. PSSST is horticulture with a horrendous twist!

One and two player option, with a host of features including sound effects.

Chess



This sophisticated program does everything you'd expect at board game level, and much more besides.

The high-resolution chessboard and pieces are arranged in a row and column system, so it's easy to key in your moves.

At any stage of the game you can request the computer to suggest a move, reverse roles or change the level of skill.

Full-colour high-resolution graphics.

Planetoids



Dodge and swerve using your thrust button, turn on a planetoid... fire! But beware – the alien ship moves fast to destroy you with cluster bombs. And when it comes to the crunch, use your hyperspace button!

Full-colour high-resolution graphics with sound.

Hungry Horace



Horace is forever being chased around the park by guards.

He steals their lunch, eats pathway flowers and creates chaos in the park by ringing the alarm!

You'll have to be quick to keep Horace out of trouble!

Full-colour high-resolution graphics with sound.

New! Tranz Am



Set in a future time ruled by cars and trophies, in a land where petrol replaces gold, and status is possession of the 8 Great Cups of Ultimate.

Driving your Super Blown Red Racer, use your skill to outwit and crash the Deadly Black Turbos. Use your instruments to locate and collect the trophies – before you overheat or run out of fuel.

A program with outstanding multi-directional movement, graphic features, and a playing area equivalent to more than 600 times actual screen area.

Horace and the Spiders



Guide Horace on the hazardous journey to the cobwebbed house full of poisonous spiders.

Safely in the house, you must move along cobwebs, choose a spot... and jump on it! The spiders will be in a frenzy – scuttling to repair their precious web.

And when a spider is spinning a new section, you're safe to attack and destroy it!

Kill all the spiders, and a new web appears... with even more spiders to catch.

Full-colour high-resolution graphics.

New! Cookie



You're Charlie the Chef, who keeps his ingredients locked in the larder. But if the ingredients escape, they bring the inedible Nasties with them!

You must daze the escaping ingredients with flour bombs, and knock them into the mixing bowl. Stop them getting into the dustbin, at all costs! And beware of Nasties that get into the mixing bowl!

Cookie is fast-moving panic in the pantry, with a cast of real characters. A program to make you smile – and sweat!

New! Jet Pac



As Chief Test Pilot of the Acme Interstellar Transport Company, your task is to deliver and assemble spaceship kits. On your way round the galaxy, you're free to collect precious stones and gold.

The catch? Rocket fuel is precious and scarce. And the aliens don't take kindly to the theft of their valuables. You'll need your wits and your lasers!

With a host of features, including multi-directional movement, explosions, sound effects and one and two player option.

ZX MICRODRIVE





NOW ON RELEASE

The ZX Microdrive® System – as you'd expect from Sinclair – is unique to the world of computing. It's a compact, expandable add-on system which provides high-speed access to massive data storage. With just one Microdrive alone (and Interface 1), you'll have at least 85K bytes of storage, the ability to LOAD and SAVE in mere seconds, the beginnings of a local area network of up to 64 Spectrums, *and* a built-in RS232 interface! The cost? Less than £50 for each Microdrive.

How to get ZX Microdrive

Spectrum owners who bought direct from us, by mail order, have been sent full details. Order forms are being mailed in strict rotation, so if you haven't yet received your order form please bear with us. We're making good progress in meeting the huge demand.

If you didn't buy your Spectrum by mail order, don't worry. Send us the form from the bottom of this page. We'll add your name to the mailing list, and send you details by return.

Each Microdrive costs £49.95. Interface 1 costs £49.95, but just £29.95 if purchased with a ZX Microdrive. Extra ZX Microdrive cartridges: £4.95.

How to order

Simply fill in the relevant sections on the order form below. Note that there is no postage or packing to pay on some purchases. Orders may be sent FREEPOST (no stamp needed). Credit card holders may order by phone, calling 01-200 0200, 24 hours a day. 14-day money-back option, of course. Please allow 28 days for delivery.

®ZX, ZX Spectrum, ZX Interface and ZX Microdrive are all registered trade marks of Sinclair Research Ltd.

sinclair®

Sinclair Research Ltd, Stanhope Road, Camberley, Surrey, GU15 3PS. Telephone: (0276) 685311.

To: Sinclair Research Ltd, FREEPOST, Camberley, Surrey, GU15 3BR.

ORDER FORM

Section A: Hardware

Qty	Item	Code	Item Price £	Total £
	ZX Interface 2	8501	19.95	
	ZX Spectrum – 48K	3000	129.95	
	ZX Spectrum – 16K	3002	99.95	
	Postage and packing: orders under £90	0028	2.95	
	orders over £90	0029	4.95	
			TOTAL £	

Section B: Software **ROM CARTRIDGE PROGRAMS**

G12/R	Planetoids	5302	14.95
G9/R	Space Raiders	5300	14.95
G13/R	Hungry Horace	5303	14.95
G24/R	Horace and the Spiders	5305	14.95
G28/R	PSSST	5307	14.95
G30/R	Cookie	5309	14.95
G29/R	Tranz Am	5308	14.95
G27/R	Jet Pac	5306	14.95
G22/R	Backgammon	5304	14.95
G10/R	Chess	5301	14.95

CASSETTE PROGRAMS for ZX Spectrum

E9/S	Chess Tutor 1	4308	9.95
E7/S	Musicmaster	4306	9.95
E8/S	Beyond BASIC	4307	9.95
E6/S	Make-a-Chip	4305	9.95
L5/S	Print Utilities	4404	9.95
		TOTAL £	

*I enclose a cheque/postal order made payable to Sinclair Research Ltd for £_____

*Please charge to my Access/Barclaycard/Trustcard account no:

*Delete/complete as applicable.

Signature

Mr/Mrs/Miss

Address

SUS 911

(Please print)

ZX Microdrive information request

Please add my name to the Microdrive Mailing List, *and* send me a colour brochure with full specifications of ZX Microdrive/Interface 1 ☐ *(tick here)*. You can use the above form to send us your name and address.

Trapping the errors will ensure first-time running

THE FIRST error code encountered by most Sinclair users is the flashing "S" on the ZX-81 or "?" on the Spectrum, which indicates a syntax error in a sentence. Experience and the manual soon show that it is caused usually by typing-in a keyword letter by letter, or by bad punctuation, for example omitting a semi-colon or an inverted comma.

The most frequently-occurring error code is "2" — variable not found. A variable is a letter which has been given a numeric value. When you enter "LET a=2" you are defining a variable. Error code 2 results when the computer reaches a variable in the program to which you have so far given no value.

Check the line which the computer specifies. If it is your program, give a value to the variable or remove it. If you are copying the program, look back in the listing to see which line you have missed.

Although the majority of error codes are explained adequately in the manuals, the report "B-Integer out of range" can be confusing. An integer is a whole number — 1 is an integer, 1.5 and $1\frac{1}{2}$ are not. That code occurs most frequently when you try to print something beyond the limits of the screen.

PRINT AT 0,31; "a" is acceptable and will print a letter "a" at the top right of the screen. PRINT AT 0,32; "a" would not be possible. The integer 32 would be out of range, resulting in error code "B". That would also happen if the computer were instructed to PRINT AT 0,31;"ab". It would still be trying to print a character beyond the limits of the screen.

That error is more difficult to detect if variables have been used as co-ordinates and your character, or series of characters, is being printed in varying positions. If the instruction PRINT AT 0,x;"a" produces report code B, make sure that the value of x never increases beyond 31.

On the Spectrum "B-integer out of range" is also often found when you are POKEing-in user defined graphics. The biggest number which can be POKEd-in this case is 255 or BIN 11111111. In that case the error code will occur in the line containing the POKE statement. In most cases, though, the error will have occurred in one of the DATA lines in the program.

A very frequent error code produced on the Spectrum is "E-Out Of Data". That will occur in a line containing a READ statement. The error code, though, will have occurred in one of the program DATA lines, which may be nowhere near the READ line. A READ command sends the computer to a DATA line to collect the next piece of DATA contained there. That is often done using a FOR, NEXT loop, especially when graphics are being set up.

FOR n=1 TO 8: READ n will send the computer to the DATA lines eight times, for eight separate pieces of information. If there are only seven pieces of DATA there it will return to the READ line and produce the code OUT OF DATA. When there are several DATA lines they will all have to be checked, because the piece of DATA you have omitted was not necessarily the last.

In some cases the computer will follow the program correctly, without producing an error code, but from the programmer's point of view the program contains an error. In that case BREAK into the program at the moment it goes wrong. That will produce report code 9 and the line on which you have STOPped the program. That method makes it easy to locate the area of the program which contains the error.

Programs which you copy from magazines, books or from friends can be difficult to error-trap because they contain programming techniques which you have not yet learned, or simply because it is often difficult to follow another programmer's logic.

The flashing "S" or "?" indicating a syntax error may appear frequently. In that case check carefully what you have copied. You may not have recognised words such as LN or EXP as keywords.

On the ZX-81 especially it is easy to forget that pressing "π" will produce the word PI.

Make sure that when the "is not equal" sign, "<>" appears in a listing you always enter it as one character and not as "is less than", "<" followed by "is greater than", ">".

Technical problems can also cause errors in programs. Any alteration to the power supply can cause a program to CRASH. In that case the screen display may change dramatically and using the keyboard will have no effect. The only solution is to unplug your computer and begin again, making sure that your power supply and RAM pack are both connected firmly. That error is caused by the computer and not by the program.

'The error need not be on the line which produces the report; that is simply the line where the computer meets the problem'

Sometimes a program listing in a book or magazine will contain what seems to be a very obvious error. If it contains key words or symbols which are not on your computer, check that it is intended for your machine. Programs for the Spectrum, the ZX-81 and the ZX-80 are not usually directly interchangeable. If a program contains the command GOTO or GOSUB — a non-existent line number — the computer will simply go to the next numbered line after that one. That is a sign that a program has been developed and improved and is rarely an error.

When you have errors in a program, first check the report codes listed in Appendix B of the manual. It may then be necessary to read the appropriate section of the manual. Remember that the error is not necessarily on the line which produces the report code; that is simply the line where the computer meets the problem for the first time.

Always check carefully every line connected with the line containing the error code and the mistake should be easy to locate.

GLOSSARY

Basic — Beginners' All-purpose Symbolic Instruction Code. A programming language resembling English which is used by beginners because most popular microcomputers have it as standard.

Bug — an error in a program.

EPROM — Erasable Programmable Read-Only Memory. Semi-permanent storage. Information is not erased if the power is turned off in the computer. Programs can be erased by subjecting the memory chips to ultra-violet light. The memory can then be re-programmed using an electrical device called an EPROM blower.

Interface — RS232 and Centronics. A device which enables other computers or add-ons, such as printers, to be connected to the computer. It converts non-standard signals from add-ons to the standard signals of the computer in use.

Kilobyte — (K). A measurement of memory size. Most machines use 16K as a minimum but 48K is generally agreed to be necessary for serious work.

Machine code — an electronic pulse code used by the computer to perform functions and communicate with memory and other devices.

Mnemonics — abbreviated instructions — for example LD for Load — used in machine language programming.

Motherboard — an external printed circuit board which is used like a multi-way plug planner. It enables other printed circuit boards, such as graphics boards and colour boards, to be slotted-in.

Port — a link to the outside world which can be used by programs and the computer.

PCB — printed circuit board. A board which has on it the electronic circuits of the computer.

RAM — Random Access Memory. Information and programs can be stored in this type of memory as electronic pulses which conform to a set of numbers — machine language — in which programs are represented in the computer. When the power is turned off the information will be lost.

ROM — Read Only Memory. Information stored in this type of memory is not lost when the power is switched off.

Software — programs which control the operation of the computer.

Syntax error — a bug caused by incorrect use of a programming language.



Our easy-to-follow guide for new owners

The basic route to a habit-forming hobby

BUYING a Sinclair machine can be the start of a life-time's obsession with home computing. It is easy, however, to become discouraged if everything does not go according to plan from the beginning.

For those with only a little knowledge of computers and their capabilities, the best way to approach the machines is to abandon any ideas for special uses. While the 48K Spectrum is big enough for simple uses in small businesses, the range of Sinclair computers does not contain machines for major uses. It is better to become accustomed to the many facilities and then decide how you wish to use them.

Begin by unpacking your machine, overcoming your surprise at its size and weight and, following the manual, set up the system. If you cannot get the K on the screen, check that everything is plugged into its correct socket and re-set the machine by pulling-out the power plug for one second and try tuning-in again. If still nothing appears, check the power supply unit by shaking it. If it rattles, return it. If it is satisfactory, check your system with that of a friend.

If you have a Spectrum you will have received an introductory booklet which explains what the computer can do and giving detailed instructions on how to set it up. Also included is a fault-finding guide.

Once the K appears you are ready to begin learning about your machine. It can prevent family arguments if you can afford a separate television set for your system. It also makes life easier if you find somewhere to leave your equipment set up permanently. You will find that a few power sockets are needed and a four-way block connector on a short length of extension cable will help to tidy trailing leads.

When using a Spectrum, a television set has to be more finely-tuned than when using a ZX-81 because of the added dimension of colour. If the set is not tuned properly, the colours will look hazy instead of sharp and clear. If no colour can be seen when it is switched on, the power supply or the television set may be at fault.

Some users have experienced some difficulty with some television sets, which include Hitachi, Grundig and Toshiba. Sets which many people have found compatible include the Sony Trinitron, Fidelity and Ferguson. Recent changes in the ULA should make more sets compatible.

The manuals are written in great detail and are reasonably easy to follow. Some of the chapters may not seem immediately relevant but it is worthwhile reading them as you might miss something important.

Patience is needed at that stage to learn the ways in which the computer will accept information. It is tempting to try to enter programs before you are ready but that is likely to lead to errors. For example, words like AND, THEN and AT should not be typed-in letter by letter.

By the time you have reached chapter 11 in the ZX-81 manual and chapter 19 in the Spectrum manual you should have accumulated sufficient knowledge to be

continued on page 141

continued from page 140

able to type-in other people's programs, such as those in *Sinclair User* and *Sinclair Programs*, without too much difficulty.

It is important when using the ZX-81 that it is not jolted. Some of the connections can easily work loose and everything which has been entered will be lost.

The manuals are not to everyone's liking and if you find them difficult to follow a number of books on the market can help you. Find the one which suits you best.

As a way of relaxing you can buy some of the growing range of commercially-produced software. That can be loaded directly from cassette but make sure that your machine is big enough to take the tapes you buy.

For the ZX-81 there are a few tapes for the unexpanded 1K machine but the majority require the 16K RAM pack. Similarly on the Spectrum most companies are taking advantage of the possibilities provided by the larger 48K machine rather than providing cassettes for the 16K.

The tapes can vary in quality and it is advisable to read the reviews in *Sinclair User* and use your judgment to find the best.

An alternative method to learn about both the ZX-81 and the Spectrum is to plunge in at the deep end and see what the machines will do. Refer to the manuals when you have difficulties. You can ignore the functions and calculations initially and experiment with PRINT statements to obtain the feel of the machines.

You may already have heard about the problem involved in SAVEing and



LOADing your own cassettes. The manual gives detailed instructions but many of the early ZX-81s would not accept tapes from some recorders. That problem is said to have been overcome but there can still be difficulties.

Usually they occur when LOADing tapes recorded by other people. One simple method to overcome this is to wind the tape to the middle of the program and type LOAD "" followed by NEWLINE; then increase the volume of the recorder slowly with the tape running until the television screen shows four or five thick black bands. If you then rewind the tape, the program should LOAD normally.

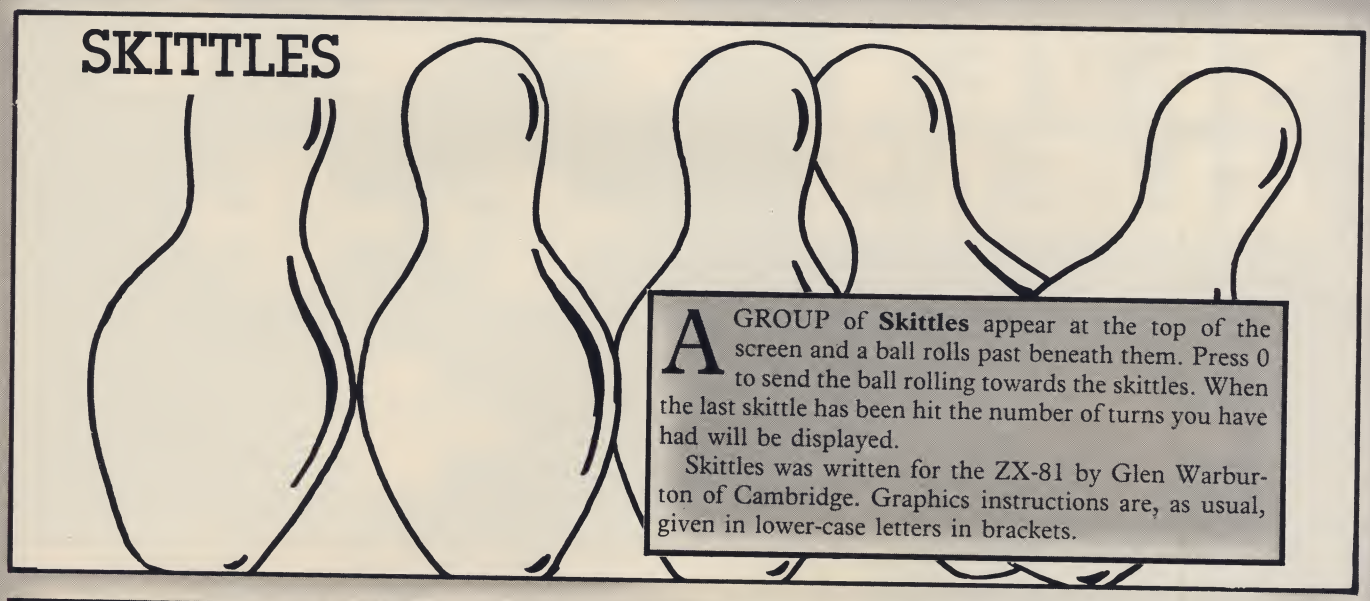
LOADing and SAVEing on the Spectrum is much easier and faster than the ZX-81. One difference is that when SAVEing on the Spectrum the LOAD lead must be disconnected either at the recorder or the Spectrum.

Finally, a health warning. Apart from any practical uses, computing with your Sinclair machine can be a very entertaining hobby and is almost certainly habit-forming. You may easily find yourself crouched over your machine, red-eyed, in the early hours of the morning thinking that in another five minutes you will solve the problem. Try to break that habit by getting into the fresh air and meeting other Sinclair users.

By obtaining a Sinclair computer you find that you have joined a not very exclusive club with many thousands of members, many of whom would be only too happy to advise you if you have difficulties.

Make sure of your regular copies of *Sinclair User* and *Sinclair Programs* and you can be guaranteed many happy hours.

SKITTLES

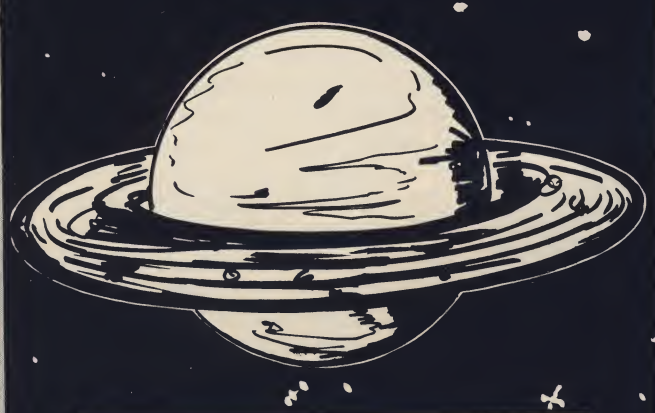


A GROUP of **Skittles** appear at the top of the screen and a ball rolls past beneath them. Press 0 to send the ball rolling towards the skittles. When the last skittle has been hit the number of turns you have had will be displayed.

Skittles was written for the ZX-81 by Glen Warburton of Cambridge. Graphics instructions are, as usual, given in lower-case letters in brackets.

```
  5 LET I=CODE " "
  6 LET O=I
 10 PRINT AT CODE " ",CODE " ";
"(1SP:SP:1SP:2*SP:1SP:2*SP:1SP:S
P:1SP)"
 20 PRINT AT CODE "(0C)",CODE "
";"(SP:1SP:SP:1SP:SP:1SP:SP:1SP
:SP:1SP)"
 30 PRINT AT CODE "(04)",CODE "
";"(1SP:SP:1SP:2*SP:1SP:2*SP:1S
P:SP:1SP)"
 100 FOR D=CODE " " TO CODE "?"
 110 PRINT AT CODE "£",D;"(1SP)"
;AT CODE "£",D;" "
 120 IF INKEY$="0" THEN GOTO 200
 130 NEXT D
 135 LET I=I+CODE "(01)"
 140 GOTO VAL "100"
 160 LET O=O+CODE "(01)"
 164 PRINT AT H,D;" "
 165 IF O<CODE "7" THEN GOTO VAL
"100"
 170 PRINT AT CODE "(0s)",CODE "
";"DONE IN ";I;" GOES"
 190 STOP
 200 FOR H=CODE "£" TO CODE " "
STEP VAL "-1"
 205 PRINT AT H,D;
 220 IF PEEK (PEEK VAL "16390"+V
AL "256"*PEEK VAL "16391")=CODE
"(1SP)" THEN GOTO VAL "160"
 225 PRINT AT H,D;"(1*)";AT H,D;
" "
 230 NEXT H
 239 LET I=1+CODE "(01)"
 240 GOTO VAL "100"
```

SPACE PROJECT SATURN

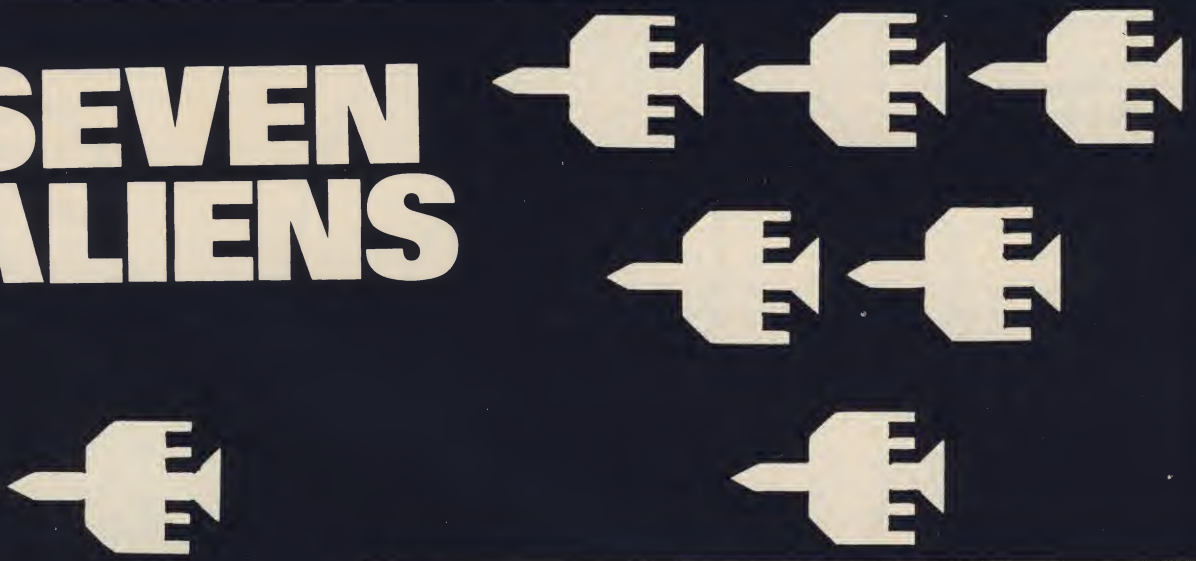


STEER YOUR spacecraft through Saturn's rings and dock at the space station on the right of the screen. Move up and down with keys 6 and 7.

Written for the ZX-81 by Alison McMillan of Dumfries.

```
 10 LET Y=PI-PI
 20 LET S=Y
 30 LET F=INT (RND*19)
 40 LET A=INT (RND*21)
 50 LET Y=Y+1
 60 FOR B=F-F TO 26
 70 CLS
 80 PRINT AT 9,15;"(96)"
 90 PRINT AT 12,15;"(97)"
100 PRINT AT F+2,31;"(1sP)"
110 PRINT AT F,31;"(1sP)"
120 LET A=A+(INKEY$="6")-(INKEY
$="7")
130 PRINT AT A,B;">O(9M)O>-"
140 IF A<>10 AND A<>11 AND B>8
AND B<16 THEN GOTO 169
150 NEXT B
160 IF A=F+1 THEN GOTO 209
170 PRINT AT 0,6;"YOUR SCORE RE
MAINS ";S;
180 PRINT TAB 6;"NUMBER OF ATTE
MPTS ";Y;
190 PAUSE 4E4
200 GOTO 30
210 LET S=S+1
220 PRINT AT 0,7;"YOUR SCORE IS
NOW ";S;
230 GOTO 179
```

SEVEN ALIENS



SEVEN ALIENS will fly across the screen from left to right. Fire from the right of the screen with 0 and from the left with 1. As your guns cannot be moved your shots must be timed precisely to hit all seven.

Written by Conor Brophy of Dublin for the ZX-81.

```
  1 REM "S"
  2 LET I=PI-PI
  3 LET O=SGN PI
  4 LET F=SIN PI
  5 CLS
  6 LET I=I+O
  7 IF I=8 THEN STOP
 10 LET A=INT (RND*VAL "12")+9
 15 FOR Z=F TO VAL "31"
 16 PRINT AT A,Z;"(1 )"
 20 IF INKEY$="1" THEN GOTO VAL
"300"
 40 IF INKEY$="0" THEN GOTO VAL
"200"
 41 PRINT AT A,Z;" "
 45 NEXT Z
 50 GOTO VAL "10"
200 LET B=VAL "63"
205 FOR A=F TO VAL "25"
210 PLOT B,A
215 UNPLOT B,A
220 LET B=B-O
225 NEXT A
230 GOTO VAL "5"
300 LET B=F
305 FOR A=F TO VAL "25"
320 PLOT B,A
325 UNPLOT B,A
330 LET B=B+O
335 NEXT A
340 GOTO VAL "5"
```

Bi g CHARACTER ENLARGER



CHARACTER ENLARGER, written for the Spectrum by I Richards of Dover, Kent will enlarge any four letters or characters you choose. When the program has been entered and RUN, enter the four letters of your choice. They will be printed at the bottom of the screen and their enlarged versions will appear at the top.

```
  10 INPUT "CHR ";a$: IF LEN a$>
4 THEN GO TO 5
  20 FOR x=0 TO LEN a$+LEN a$*5
  30 PRINT AT 21,0;a$
  40 FOR n=0 TO 7: FOR z=0 TO 7
  50 LET a=POINT (n+x,z)
  60 IF a=0 THEN PRINT AT z-8,n+
x;" "
  70 IF a=1 THEN PRINT AT z-8,n+
x;"(isP)"
  80 NEXT z: NEXT n: NEXT x
  90 PRINT AT 21,0;"    "
 100 INPUT "PRESS ENTER TO RUN A
GAIN ";z$: RUN
```

snake



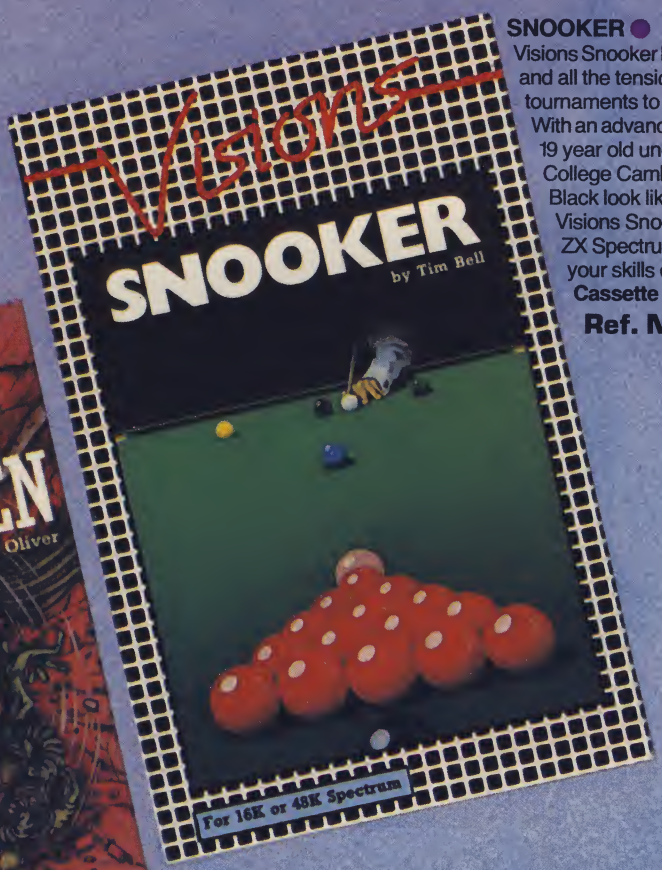
BLUE, GREEN and magenta squares are scattered across the screen. Blue squares are worth 10 points, green are worth 20 and magenta worth 30. Using the usual cursor keys, hit each square once, first all the blue ones, then all the green, and finally all the magenta ones. Once you have hit a square it will turn white. You must touch nothing white—not your trail, white squares, or the edge of the playing area.

Snake was written for the 16K Spectrum by Kristofer Gamstedt of Erebro, Sweden.

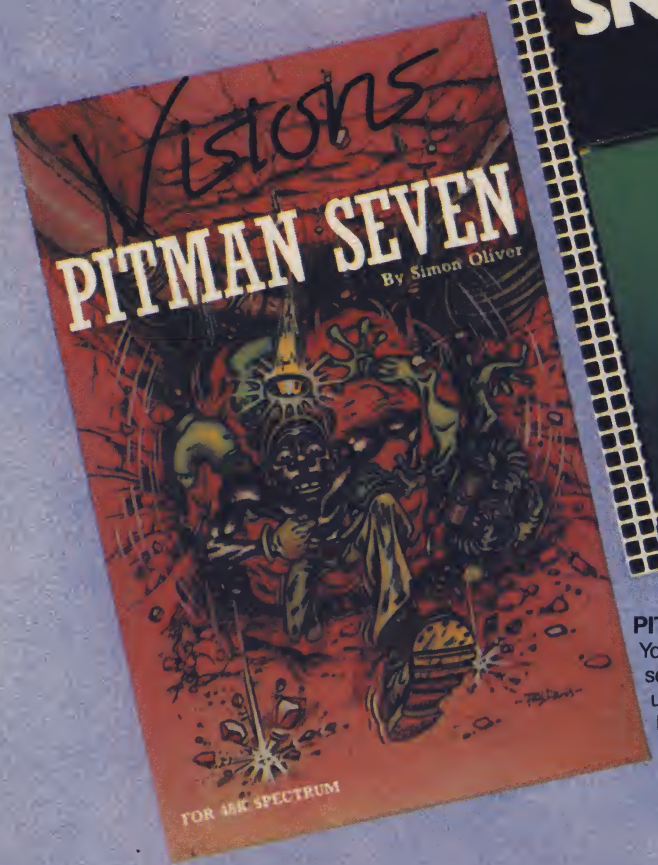
```
  10 PAPER 0: BORDER 0: CLS
  20 RANDOMIZE : DEF FN s(x,y)=1
0*(6-ATTR (INT ((175-y)/8),INT (
x/8)))
  30 PRINT AT 0,10; INK 7; PAPER
 2; FLASH 1;"*** SNAKE ***"
  40 INK 7: PLOT 0,167: DRAW 255
,0: DRAW 0,-159: DRAW -255,0: DR
AW 0,159
  50 FOR f=1 TO 40: LET c=INT (R
ND*3)+3: LET a=INT (RND*17)+2: L
ET b=INT (RND*27)+2: PRINT AT a,
b; INK c;"(isP)": NEXT f
  60 PRINT AT 10,14;"    ": LET
x=112: LET y=88: LET a$="8": LET
 p=0: LET p1=0: LET p2=0: PRINT
AT 21,11;"SCORE="
  70 PLOT x,y
  80 LET b$=INKEY$: IF b$="" THE
N LET b$=a$: GO TO 100
  90 LET a$=b$
 100 LET x=x+(b$="8")-(b$="5"):
LET y=y+(b$="7")-(b$="6")
 110 IF POINT (x,y)=0 THEN GO TO
 70
 120 IF FN s(x,y)=-10 THEN GO TO
 170
 130 LET p1=FN s(x,y): IF p1>=p2
 THEN LET p2=p1: LET p=p+p1: PRI
NT AT 21,17;p: BEEP .03,10: GO T
O 140
 135 GO TO 170
 140 PLOT x+(4 AND b$="8")-(4 AN
D b$="5"),y+(4 AND b$="7")-(4 AN
D b$="6")
 150 LET x=x+(8 AND b$="8")-(8 A
ND b$="5"): LET y=y+(8 AND b$="7
")-(8 AND b$="6")
 160 GO TO 70
 170 BEEP 2,-10: INPUT "GAME OVE
R! ANOTHER GO?";a$: IF a$(1)="y"
 THEN GO TO 10
```

ALL THE BEST FO

Here's a sure-fire way of making certain this Christmas is packed full of fun for you and your friends. We've searched for brilliant new program sources throughout the U.K. and North America to find an exciting collection of new games — and business programs — many of which cannot be bought by mail order from any other source! These are our latest exclusive offerings. Make sure you place your order now to receive them in time for Christmas.



SNOOKER
Visions Snooker brings all the excitement and all the tension of big time tournaments to your TV set.
With an advanced program written by a 19 year old undergraduate at Queens College Cambridge, it makes Pot Black look like a load of old balls.
Visions Snooker for the 16K ZX Spectrum. It's an exciting test of your skills on the cue.
Cassette price: £8.95.
Ref. No: 2-53



PITMAN SEVEN
Your mission is to rescue two teams of seven desperate men, trapped underground on level five. You must bring each man to the surface, surviving the dangers you meet en route.
ZX Spectrum 48K.
Cassette price: £6.95.
Ref. No: 2-52



FREE BLANK C15 CO[MPUT]
WITH EVERY TWO CA[SETT]
Remember there's no li[mit] to the [n]
cassettes you receive if yo[u] order jus
why not get together wi[th] friends
members and sh[are] the fre

GREAT VALUE! TREMENDOUS SELECTION! PLUS A FREE OFFER EVERY TIME!

Fill in the order form right away — we're guaranteeing fast delivery, quality and satisfaction (after all, we want you to come back for more!)

The Software Workshop, Yew Tree, Selborne, Hants GU34 3JP

GUARAN[TE]
Order with complete [satisfa]ction or if not entirely satisfied [with] your purchase retu[rn it] to days and we will pro[vide a]

FOR CHRISTMAS!

And here's a further selection of the latest games, the best-value software for your ZX-81 or Spectrum.

ZX81 Software

1-01 **Stock Market** — £3.95
Buy and sell your way to millions! 16K RAM

1-02 **Football League** — £3.95
First division fun for the soccer enthusiast. 16K RAM

1-03 **Test Match** — £3.95
Match your wits alongside the superstars. 16K RAM

1-12 **Avenger** — £4.95
Avoid missiles and bombs to become the ruler. 16K RAM

1-13 **Protector** — £4.95
Defend your own ship from oncoming attackers. 16K RAM

1-31 **Comp-U-Share** — £9.95
Investment management program for unit trusts, shares and loan stocks. Complete documentation included. 16K RAM

Spectrum Software

2-13 **Sentinel** — £4.95
Guard your mother ship against alien attacks. 48K RAM

2-14 **Meteor Storm** — £4.95
Spectrum version of the ever-popular arcade game. 16K or 48K RAM

2-15 **Star Trek** — £4.95
Popular space program brought to life by excellent graphics. 48K RAM

2-21 **Frogger** — £5.95
Manoeuvre the frog across the road avoiding heavy traffic. 48K RAM

2-22 **Crazy Balloons** — £5.95
Guide the balloons round the maze without bursting. 48K RAM

2-23 **Arcadia** — £5.95
The expert's version of the popular 'Invaders' game. 16K or 48K RAM

2-24 **Golf** — £5.95
The finest of golf handicap games. 48K RAM

2-25 **Test Match** — £5.95
More exciting than the real thing! 48K RAM

2-26 **Derby Day** — £5.95
This favourite has to be a winner. 48K RAM

2-41 **Comp-U-Share** — £9.95
See 1-31 under ZX81. 48K RAM



SHEER PANIC
Mining for Magnetic Quartz is a hazardous business. You have to ensure that there is plenty of oxygen to breathe, fight off the local monsters with only a shovel and counter interference with your consciousness.
ZX Spectrum 16K or 48K.
Cassette price: £5.95.
Ref. No: 2-51

To: The Software Workshop, Yew Tree, Selborne, Hants GU34 3JP

I wish to order the following programs. I understand that:

* I will receive a FREE blank cassette with every 2 programs ordered
* I can return products within seven days if not entirely satisfied and receive a replacement.

Ref No	Qty	Title	Price

Postage, packing and handling: add 45p for the first cassette, and 25p for each additional cassette. Non-UK orders add extra 50%

Total

I enclose a cheque/postal order for _____

Name _____

Address _____

(Allow 28 days MAXIMUM FOR DELIVERY)

CONPUTER CASSETTE
CASSETTES YOU ORDER!
o limit to the number of free
your order justifies them — so
r with friends or user group
l shar the freebies?

RANTEE
e confidence. If you are
ied with the quality of
turr it to us within 7
provde a replacement.

VALH

48K SPECTRUM



ALLA

MOVi SOFT ©

LEGEND

VALHALLA is supplied on a 48K Spectrum program cassette, with VALHALLA player manual and presentation box. As VALHALLA uses the full 48K RAM, microdrives and full-size printers are not supported. ZX printer optional.

VALHALLA is normally available from stock, and orders are despatched by return. If, for any reason we are unable to fulfil your order within 14 days of receipt, we will notify you.

VALHALLA cassettes carry an unconditional lifetime replacement guarantee.

TO ORDER: (UK Orders Only) Simply complete the coupon, and FREEPOST with your cheque/P.O. made payable to LEGEND (UK Mail Order).
Credit Card Orders: By phone 9-5.30 Mon to Fri. stating name and address, Card No. and item(s) required.

RETAILERS: Please contact your regular distributor or LEGEND (Trade Distribution) at the address below.

LEGEND (UK Mail Order) FREEPOST
1 Milton Road, Cambridge CB4 1UY
(0223) 312453

MOViSOFT OPERATING SYSTEM UNDER LICENCE.

Post to:- LEGEND (UK Mail Order) FREEPOST
1 Milton Road, Cambridge CB4 1UY
Please send me.....Copy/copies of VALHALLA for the 48K Spectrum.
I enclose cheque/P.O. for £.....
(£14.95 each incl. VAT and P&P).
Or I wish to pay by Access/Barclaycard/Visa
Card No.....
Please print name and address
Name.....
Address.....
.....
.....
Credit Card holder's signature.....

SU11

ROSE SOFTWARE

EDUCATIONAL SOFTWARE FOR THE SPECTRUM (16K or 48K)

YOUNG LEARNERS 1

4 programs for the young computer user: abacus, telling the time, shopping and snakes. All with excellent graphics. An easy introduction to computer aided learning.

£5.95 per cassette

G.C.E. "O" LEVEL MATHS REVISION GEOMETRY

6 programs of multiple choice questions, covering properties of parallel lines, triangles, various polygons and circles. All questions use generated numbers. An explanation of the correct answer is given.

G.C.E. "O" LEVEL FRENCH VOCABULARY REVISION

Six programs on one cassette. The first 3 programs test vocabulary under various headings: eg "on holiday". Three further programs: homework tester, common words and phrases, and irregular verbs.

We have a large range of educational programs for the Spectrum and ZX81.

Send sae for catalogue of all our products to:
ROSE SOFTWARE,
148 Widney Lane, Solihull, West Midlands B91 3LH

HORNBY SOFTWARE



SPECTRUM PRO GOLF SERIES

The nearest to the real thing

* Recommended by "Sinclair User", August

EXACT SIMULATION OF BRITAIN'S TOP GOLF COURSES

(1) ALL GOLF RULES APPLY
(2) DESIGNED FOR ONE OR TWO PLAYERS
(3) PLAYED OFF ANY HANDICAP
(4) ON EACH HOLE DIST, PAR, GREEN ENLARGEMENT
(5) CONTROL SHOT — CLUB, STRENGTH, DIRECTION, SHAPE OF SHOT
(6) GRAPHICS EXCELLENT
(7) EXTREMELY REALISTIC

*** TROON £6.95 48K**
ROYAL BIRKDALE £6.95 48K
LINDRICK £6.95 48K
(NEW) WENTWORTH — BOTH COURSES £10.00 48K
PRO GOLF £4.95 16/48K
9 HOLE SIMULATED COURSE
ALL PRICES INCLUSIVE OF VAT, P+P, AVAILABLE FROM:

HORNBY SOFTWARE

21 PINFOLD HILL, LEEDS LS15 0PW

SU11

Now you can take a new

AMERICAN look at your Sinclair!

With the new Timex Sinclair User magazine to link YOU into a huge network of American enthusiasts

Published monthly since May, Timex Sinclair User has taken the States by storm. It is packed full of news, reviews, programs and user information . . . linking you into the vast Timex Sinclair User network.

Remember, this is a new magazine written from the American viewpoint — but it could open up whole new horizons for you on your Sinclair enjoyment. Take the new American view by ordering right away and see how the U.S.A. welcomed the Sinclair!

The success of the Sinclair ZX80, ZX81 and Spectrum in the U.K. has been phenomenal. But in the States the Sinclair has been given a real American welcome — making the Sinclair range the biggest seller in the world! The American ZX81 equivalent: "The Timex Sinclair 1000" from the giant Timex organisation, has been bought by hundreds of thousands of enthusiasts.

The success of 'Sinclair User' magazine in the U.K. followed a similar pattern — so now we have matched the U.S.A. enthusiasm with a brand new U.S.A. magazine — *the Timex Sinclair User!*

Annual subscription rate is £20. Single copes are £2 (including P & P).

Send to: TIMEX SINCLAIR USER, ECC Publications Ltd., 196-200 Balls Pond Road, London N1 4AQ

Yes, I want to subscribe to TIMEX SINCLAIR USER at the special U.K. rate of £20 for 12 issues delivered to my door.

Name _____

Address _____

I enclose a cheque/P.O. for £_____

Please charge my credit card

Card Name_____ **Card Number**_____

Signature_____ **Date**_____

N.B. This offer applies to UK subscribers only. Overseas rates available on request.

Fill in the order form NOW to discover the American way of computing!



N.B. Subscribers to Sinclair Programs or Sinclair Projects should be aware that Timex Sinclair User will occasionally reproduce top articles that have appeared in our U.K. magazines.

Quentin Heath goes in search of gold nuggets in Greedy Gulch with an unusual bunch of adversaries

Beginners' adventure in the wild west

MANY ADVENTURE games contain fierce adversaries such as vampires, werewolves and slugs. **Greedy Gulch,** however, contains none of those and the only adversaries with which the player has to contend are natural hazards such as the desert and an unstable mine shaft.

It would be helpful if I detailed a complete list of the objects you have to find but this month I will give you only some gentle nudges in the proper direction, as Phipps Associates, the manufacturer of the adventure, has informed me that it is for beginners. All Hobbit-hardened players should have no problems.

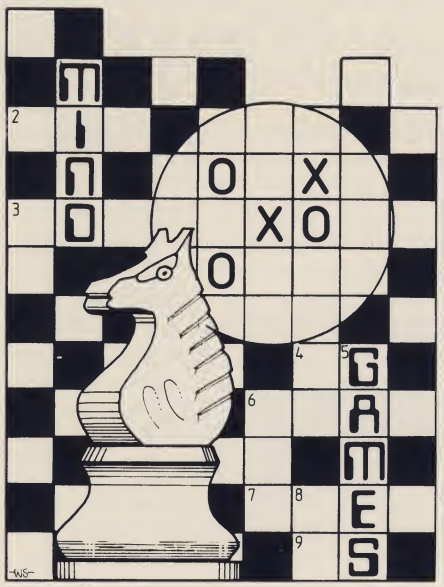
An incomplete inventory of objects includes a gun, a lamp, some matches and a hat. All those items make sense with the object of your quest a nugget in the gold mine located in the centre of a vast desert.

As the town is the focal point of the game you have to start in the main street, where you should be able to see the sheriff's office and the hotel. Make sure that you visit all locations, especially the hotel lobby.

The decor of the lobby may not be interesting but you should walk to the reception desk, which is deserted, and look at the register. You will find something interesting in it. That vague clue may not offer you much help but I can assure you that when you have wandered round the town for several turns the name you find at the hotel will click into place and provide you with a clearer picture of what you are trying to do.

Your encounter with the register in the hotel should give you some idea of how objects have been spread logically around the locations of the adventure. I have given a brief list of some of the objects which can be found in the town.

Pairing the locations which the computer will give you either on the graphic displays or from the text below them on the screen, you should be able to tell where the other objects are located. For instance, you might find some kind of weapon in the sheriff's office and another more practical one in the blacksmith's forge.



You will soon become adept at collecting objects but do not be lulled into a false sense of security when the computer tells you that you cannot pick up any more items. There is an object in almost every location and that is more than you can carry.

The best way to collect all objects is to pick them up from the individual locations and carry them to the outskirts of the town where the desert begins. You must have every item or you could lose your way in the desert or be thirsty. Both events mean certain death.

I have noticed that many adventurers take objects and do not appreciate that they could be connected with other items which will be found in the game. There is reluctance to return to places which have already been visited but Greedy Gulch will teach you that in some cases it is necessary.

There are at least three objects linked with each other in the game and because the adventure is for beginners they are all easily linked when you have found them. The only clue I will give as to the items is that they should keep you enlightened during the game, even if they do not keep you cool in the desert.

The language structure of the program is simple and, as a result, communication with the computer is easy. Like most early adventures the program uses the word pattern of verb followed by an object. It will respond quickly to commands such as GET AXE but has difficulty with conjunctions such as AND.

The best approach is to think of the easiest way of saying something; never ask a question and keep your commands within the context of the situation in which you are playing. By observing those rules you will waste less time.

Greedy Gulch is an adventure in which the number of turns you take is important. That does not mean that you have to finish the adventure within a number of turns but to act a certain number of times. For instance, you may get nothing out of the pump in the centre of the ghost town for two turns. You need to crank the handle of the pump a few times before anything will happen. If you do not you will look like a drip.

Once you have water and all the weapons and objects you need, you can prepare to leave town and go into the desert where, after much searching of the soul — and searching for water — you will find the mine.

If you have not picked up all the items in the town, or if you have missed the vital item, you will land in an area

'Your encounter with the register in the hotel should give you some idea of how objects have been spread around locations of the adventure. Pairing locations will help find the objects'.

from which you cannot escape. The desert will claim you. The object you must have in your possession when you jump over the ravine is something which will show you the way. It is easy to become lost if you forget it.

If you are lost in the desert and you are not in the place of no return, there is a simple way out of your dilemma. The only thing you can lose if you fail in your attempt to get back to the orginal location is one of the carefully-collected objects.

Drop an object at your present location. From there you should try to go in a circle. If you cannot go one way, try the other. At some point, two moves after you dropped your object you should arrive back at the location of the item. From the centre of the desert you must go south and then west to reach the cave. With the knowledge of the circular direction which you took and the number of turns which you needed to get back to the object which you dropped you should be able to determine where you are.

If you are still having difficulty the computer will give you a hint about the general direction in which you should go. I see no harm in letting you know this now, so what you should do is look at Zeek's map. That will not give you the complete answer but it will point you in the general direction of the mine.

You may still be wondering how to carry all those objects around with you on your back when there are at least two objects you cannot carry.

To take all the objects to the desert you must make some trips back to town. I can assure you that there is a way back, even though it is along a winding kind of route. When you get back, pick up your objects and jump across the ravine again until you reach the place where you have been hoarding all the items. You will have to make several trips but they are worth your while.

> 'It took me a long time to decide the map was important'

One object not to drop before you return is the map which you must have to get back into the correct part of the desert. Do not make the mistake I made several times when playing the adventure; it took me a long time to decide that the map was important.

Another reason for taking the long route from the desert back to town is the need, by your player-character, for water. Do not forget that you have only a small bottle of liquid and you will need that after several steps into the desert. You should be called upon only once to drink water. If the computer asks you more than once you have either been very unlucky or have been going round in circles. The best way to solve that problem is to find an oasis which you should reach if you are on the correct track for the mine.

Your encounter with the entrance to the mine will be sudden. Do not jump in immediately or you could die very quickly. The mine has only two or three locations to it but they are dangerous. You will need at least one of the weapons you collected in town before you pass on to find out the meaning of the Adventurer's Delight.

Phipps Associates provided me with a map to help with the adventure. That, however, provided more problems than it solved, so the clues I have given are more from experience than from cheating with a reviewer's prop.

The game is difficult and provided me with hours of frustration. I was very close to finishing, only to find that at the last location a nasty-looking reptile appears from nowhere.

Next month I will be in festive mode, looking at some mind games you might like for Christmas.

A world of activity for you and your Sinclair



Whether you have a ZX80, ZX81 or Spectrum — we can show you there's far more to your Sinclair than you ever thought possible. That's the *active, lively* world of **Sinclair User** — the first magazine written specially for everyone who owns or uses a Sinclair computer.

Every month, there is a whole range of games, business ideas and bright new ways to learn. There is the Sinclair User Club, with special exclusive member offers. There are technical facts, development news and advice, plus hints from other users and answers to queries — in fact everything you need to be an interested, informed and ACTIVE Sinclair user.

There's just one problem — **Sinclair User** sells out fast! So make sure you don't miss your copy: order it today from your newsagent — or complete the subscription form below and we will send it to you direct, every month.

Mail to: ECC Publications Limited, 196–200 Balls Pond Road, London N1 4AQ Yes — I'd like to subscribe to Sinclair User (12 issues — price £11.00 including P&P) I enclose a cheque for £ _____

Please charge my credit card: Card name _____ Number _____

Name _____ Address _____

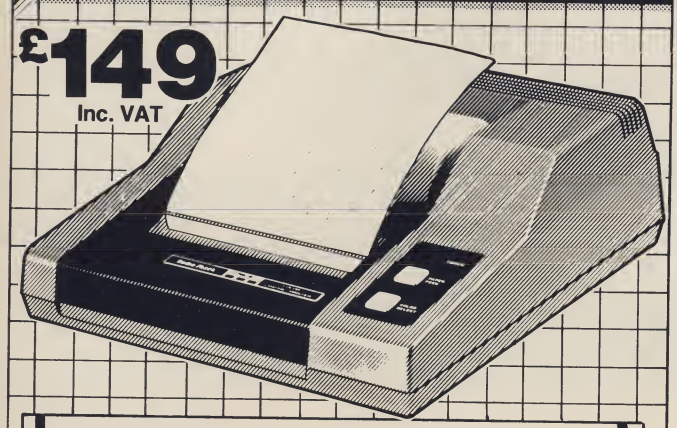
Signature _____ Date _____

NB This offer applies to UK subscribers only. Overseas rates available on request.

Tandy TRS-80

The Tandy Four Colour Graphics Printer

£149 Inc. VAT



CGP-115. Creates beautiful graphics in red, blue, green and black. Text mode prints 40 or 80 characters per line at 12 characters per second. Includes serial and parallel interfaces and easily replaceable ink cartridges and standard 4½" paper rolls. **26-1192** **£149.00**

Tandy® *The Biggest Name in Little Computers*

See Our Extensive Range of Microcomputer Accessories At Any One of the 340 Tandy Stores Nationwide!

TRACE

For any ZX Spectrum, and now for the 16K ZX81!!!

A superb aid to programming the ZX81/SPECTRUM, allowing you to watch what your BASIC programs are doing every step of the way. Bugs in your programs will be easier to find. Example programs will almost explain themselves.

Before the ZX81/SPECTRUM executes each BASIC statement in your program it will display the line number, statement number (SPECTRUM), and the statement itself in the input area (it will not overwrite the main display area). The speed is controllable from single step upwards. You can produce a TRACE listing on the ZX printer, stop your program at any point to print variables or correct errors, and start/stop tracing from anywhere in your program.

"an effective TRACE . . . a useful debugging tool . . .easy to use". S.U. 9/83 reviewing SPECTRUM version.
It might even help you find the errors in the magazine listings!

ZX81 (16K) Version £5.95
Spectrum Version £6.95

Including P & P from:

TEXGATE COMPUTERS LTD.
Dept.S., 14 Brook Lane, Corfe Mullen, Dorset BH21 3RD

Coming soon

Only £1.95

The Second Sinclair User Annual

The most up-to-date guide to the world of Sinclair computers

Full reviews of all the top software, complete Basic programming course latest round-up of peripherals, masses of the best program listings and much more

Make sure you do not miss your copy.
Place an order today.

To Sinclair User, ECC Publications, 198-200 Balls Pond Road.

Name I enclose a cheque for £

Address Signed

.....

.....



offers the most sp
under the Spect

™Prestel and the Prestel symbol are trademarks of British Telecommunications.
**Subscribers are responsible for quarterly Micronet 800 and Prestel subscription charges.*

Micronet 800. The spectacular service that gives micro-users access to a huge database of information, hundreds of software programs, and communication with other users.

Sinclair ZX Spectrum. The home computer that's out-shone all its rivals.

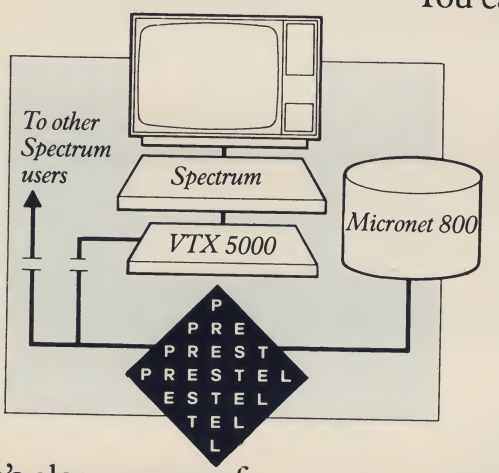
Bring the two together and it's a combination that opens up a breathtaking new world of microcomputing possibilities.

Suitable for either the 16K or 48K versions, the Prism VTX 5000 modem was designed specifically for the Spectrum and fits neatly under the micro.

Plug the other end into the outside world via your telephone and your system will give you more than you ever dreamed possible.

Micronet 800 is fun, friendly and inexpensive to run. Choose from hundreds of free games, download and use them on your Spectrum whenever you like, play on-screen games (as easy – and inexpensive – as a local phone call), and compete in Big Prize games and quizzes. There's also a range of downloadable games you can buy for less than over-the-counter prices.

Learn through up-to-date education packages, and help run the household with simple business packages.



And if you need fast facts about the world of computers, Micronet 800 provides constantly up-dated product comparisons, reviews, prices, dealership and 'best-buy' information – 24-hours a day, 7-days a week.

You can access over 250,000 pages of Prestel™ information covering news, travel, holidays and entertainment, together with an electronic booking service.

Keep in touch – you can send electronic mail to any other Micronet 800 or Prestel user.

The VTX 5000 provides a full Prestel screen with graphics, and an off-line message composition facility for speedy transmission when you go on-line.

You can use the Sinclair printer to print frames and messages, or save them on tape for future use.

All this – and even more as the service grows – retails at the low price of £99.95 inc VAT.

Plus, as a special offer to early users, we will provide you with a jack-socket installation (should you need one) completely free of charge.

So don't delay – send the coupon today.

micronet 800

Micronet 800 pectacular add-on ectrum.

☐ Please send me a complete Micronet 800 information pack containing details of Micronet 800 and the VTX 5000, and including a Micronet subscriber's application form.
☐ Please send me ____ (No.) VTX 5000 modem(s) at £74.95 each inc. VAT:
☐ I enclose a cheque made payable to Telemap Ltd. for £_____
☐ I wish to pay by credit card: Visa, Access, Diners Club, American Express.
(Delete as applicable) Amount £_____
My credit card No. is _____ Signed_____
Name_____ Address_____
_____ Tel: _____

Micronet 800, Scriptor Court, 155 Farringdon Road, London EC1R 3AD. Tel: 01-278 3143.

◆ One of the many faces on Prestel

Exclusive S.U. Offer—£10 off.

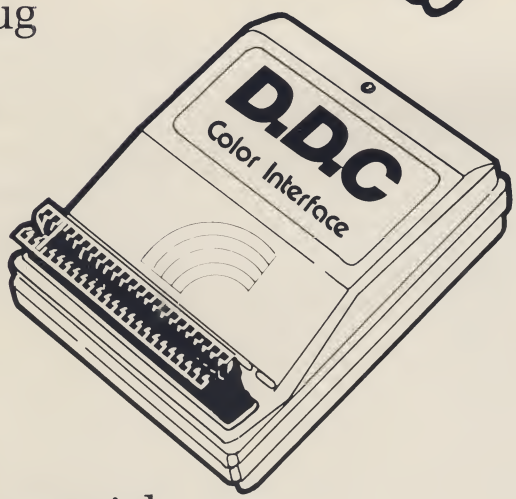
DON'T MISS THIS INCREDIBLE SINCLAIR USER OFFER



For use with ZX-81/ZX-80

1K RAM is enough to obtain 8 colours.

Easy to connect Direct Basic INPUT TEXT and colours simultaneously. Plug directly in your Sinclair connector.



Compatible with all the memories.

Add More Appeal to your **ZX-81** (and ZX-80) thanks to the DDC Colour Interface*

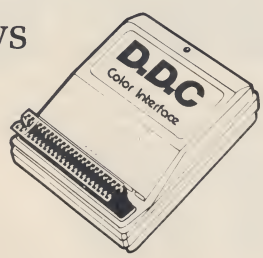
Save £10 on a DDC colour interface. A special offer open only to readers of Sinclair User.



And at a realistic price of only £29.95 (+£2.95 p&p) usually £39.95

*Compatible with many Quicksilva and Artic software.

Limited stocks, so place your order soon. Allow 28 days for delivery.



The prices apply to United Kingdom only. Overseas orders can be accepted but there will be an extra postal charge. The full price can be obtained on application to ECC Publications at the address on the coupon.

To: Sinclair User Special Offer,
ECC Publications, 196/200 Balls Pond Road, London, N1 4AQ

Please send me _____ DDC Col. J at the special *Sinclair User* price of £29.95 plus £2.95 p&p.

Please tick if you require a VAT receipt ☐

*I enclose a cheque/postal order payable to ECC/SU for £ _____

*Please charge to Access/Barclaycard/Trustcard account no. _____

*Please delete/complete as applicable

Signature _____

Name Mr/Mrs/Miss _____

Address _____

THE ARCADE COLLECTION



GRID RUN is a high resolution, fast machine code game using the spectrums sound and colour to the full. Set in a maze you must avoid oncoming android cars bent on your destruction. Bonus car every 10,000 points "Famous Five" hall of fame, increasing speed and difficulty. There is even a hold button to get your breath back.

PONTOON included on side B absolutely free. Pontoon has full graphical representations of all the cards including King, Queen, Jack, "Intelligent" play of aces, and full analysis of results at end of each game. REF. GRID.



LAST SUNSET FOR LATTICA (Original) is a true graphical adventure game in real time. Your aim is to defuse a bomb hidden somewhere in a highly complicated maze avoiding many well armed androids along the way. Extra lives are there for the taking, so are the keys to take you to the next level and all the while time is running out for the little Planet of Lattica. REF. SUN.



THE DETECTIVE (Original) You thought it was just another "Take the secrets from a Safe and Run" job but the mob thought differently. They will try everything to stop you this time, if madmen, lasers, bombs, dynamite, daggers, barrels, blister bombs, crates, helicopters, jets and fourteen other levels do not get you, you might just make it. Opening the safe has its pitfalls too. Fast moving, m/c game with excellent graphics and sound. A very addictive game. REF. DET.



RAIDER OF THE CURSED MINE (Original) Greed drove you down into the old diamond mine, sheer determination and luck is the only way out again. Lifts help you, so do lamps, and diamonds can be worth a fortune but beware of the evils that lurk deep in the mine. Trolls who throw boulders at you, spiders who eat you, ghosts who show no mercy and bats who steal things, add to this a time bonus and you have an exciting Arcade quality game. Reach level 32 and escape to the big outside world. REF. RAID.

All these games are available for the ZX Spectrum 48K for the incredible price of only **£5.50** including P&P VAT etc. Just complete the mail order form for prompt dispatch by return of post.

Arcade are committed to original game concepts so look out for new titles in the Arcade range. Trade enquiries welcome. Phone Orpington 35639 anytime or write to Arcade Software Ltd, Technology House, 32 Chislehurst Road, Orpington, Kent BR6 0DG.

TO: ALL MAIL ORDERS

Qty.	Item	Item Price £	Total £

DON'T FORGET YOU CAN ALWAYS ORDER ON THE TELEPHONE WITH YOUR CREDIT CARD. TRADE ENQUIRIES WELCOME.

*I enclose a cheque/postal order payable to ***ARCADE SOFTWARE LTD,*** for £.....*Please charge to my Access/Barclaycard account no.

*Please delete/complete as applicable.

Signature _____

Name: Mr/Mrs/Miss _____

Address _____

SU2

SOFTWARE DIRECTORY

OUR NEW software listings service has been welcomed by readers. This month, and from now on, we are publishing the full list, updated with the latest releases such as Maziacs from dK'Tronics and Spectipede from R and R.

If we have reviewed a cassette we shall give it a rating known as the Gilbert Factor, named after our software editor John Gilbert. Although the final figure is out of 10 it is the result of a complicated calculation involving a number of factors which are taken into account when assessing how good a cassette is.

The factors include value for money, the layout of the screen instructions, conciseness of the program and its speed of operation, the accomplishment of the task it aims to achieve, the innovation of concept, and the use it makes of the machine.

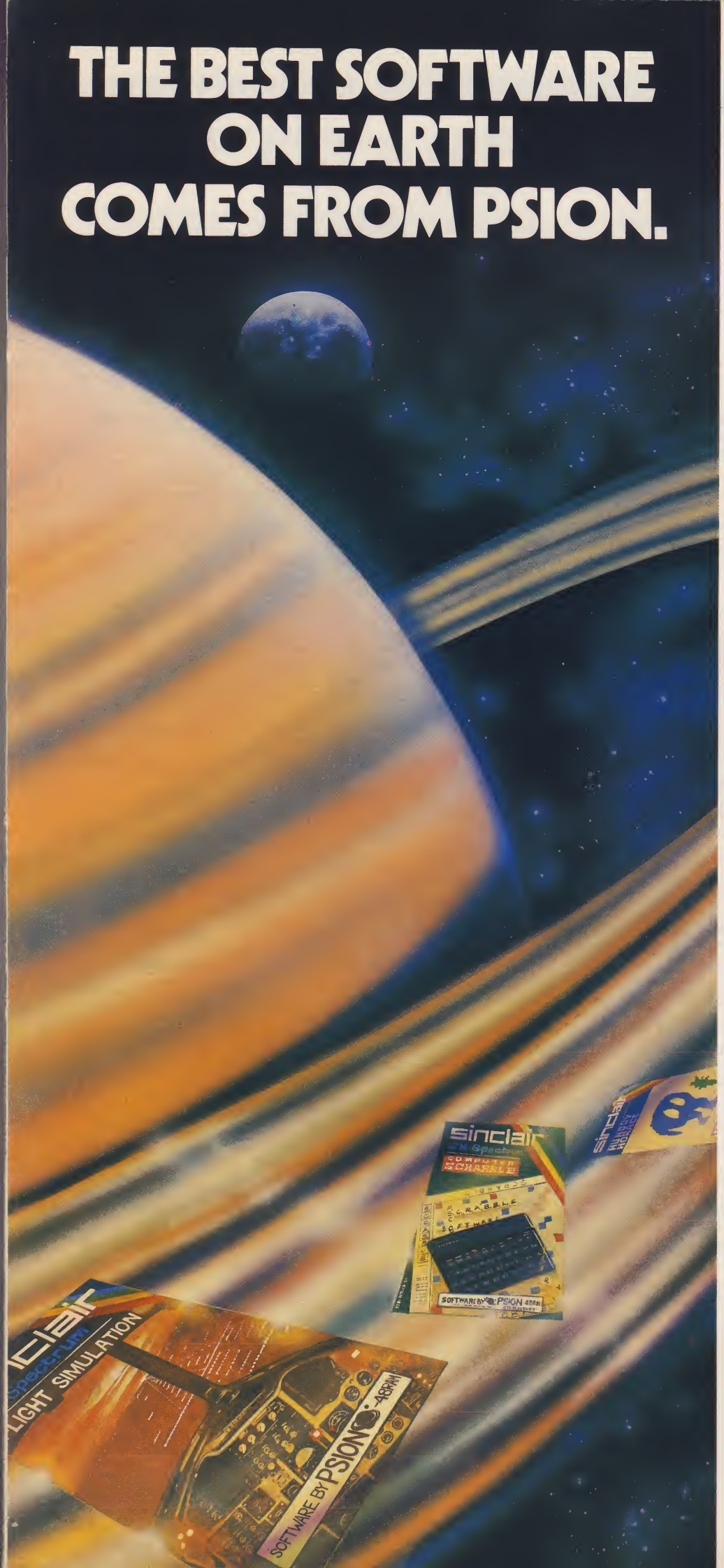
While trying to ensure that all software is dealt with it is inevitable that some will be omitted. We will remedy any omissions later. Lack of space means that we cannot publish the complete list in one issue. The remainder of the list will be published next month and we will repeat this month's one month later.

Any suggestions for its improvement will be welcomed.

Name	Machine	Company	Type	Gilbert factor
ABC Liftoff	48K Spec.	Longman	Education	*
Accounts (Sole Trader)	48K Spec.	Hestacrest	Business	*
Accounts (Limited Company)	48K Spec.	Hestacrest	Business	*
Accounts (Sole Trader)	16K ZX-81	Hestacrest	Business	*
Accounts (Limited company)	16K ZX-81	Hestacrest	Business	*
Address Manager	48K Spec.	OCP	Business	7
Adventure 1	48K Spec.	Abersoft	Adven.	6
Adventure 1	16K ZX-81	Abersoft	Adven.	6
Adventure Isl.	48K Spec.	Contrast	Adven.	*
Airline	16K ZX-81	CCS	Sim.	*
Airline	48K Spec.	CCS	Sim.	*
Airliner	16K Spec.	Protek	Sim.	*
Air Traffic Controller	16K Spec.	Hewson	Sim.	6
Alien Dropout	16K ZX-81	Silversoft	Arcade	*
Allsort S-1	48K Spec.	A Firminger	Utility	7
Alphabet	16K Spec.	Widget	Education	*
Android One	16K Spec.	Vortex	Adven.	*
Apocalypse	48K Spec.	Red Shift	Mind Game	*
Arcadia	16K Spec.	Imagine	Arcade	5
Arcadian	16K Spec.	J K Greye	Arcade	*
Armageddon	48K Spec.	Silversoft	Arcade	*
Aspect	16K Spec.	Bug Byte	Utility	5
Assassin	16K Spec.	Spectrasoft	Arcade	*
Assembler	48K Spec.	Artic	Utility	6
Asteroids	16K ZX-81	Silversoft	Arcade	*
Asteroids	16K ZX-81	Software Farm	Arcade	6
Astral Convoy	16K ZX-81	Vortex	Arcade	*
Astrology	16K Spec.	Stellar Servs.	Utility	7
Astrology	16K ZX-81	Stellar Servs.	Utility	*
Audio Sonics	16K Spec.	Work Force	Utility	4
Auto Chef	16K Spec.	CCS	Sim.	*
Auto Chef	16K ZX-81	CCS	Sim.	*
Avenger	16K Spec.	Abacus	Arcade	*
Backgammon	48K Spec.	CP	Mind Game	*
Backgammon	16K Spec.	Hewson	Mind Game	*
Bank Account Syst.	48K Spec.	K Gouldstone	Business	8
Bank Raid	16K ZX-81	J M Senior	Game	*
Barrow Quest	16K ZX-81	Sherry	Adven.	*
Base Invaders	48K Spec.	Work Force	Arcade	6
Battle of Britain	48K Spec.	Microgame	Strat.	*
Battleships	16K ZX-81	JRS	Strat.	*
Beamscan	48K Spec.	Hilderbay	Utility	*
Beamscan	16K ZX-81	Hilderbay	Utility	*
Beamscan	48K Spec.	Beamscan	Utility	*
Big Match Soccer	16K Spec.	Winters	Strat.	*
Biorythms/Pyramids of Egypt	16K Spec.	Spectrasoft	Game	*
Black Crystal	48K Spec.	Carnell	Adven.	7
Black Crystal	16K ZX-81	Carnell	Adven.	7
Black Dwarf's Lair	48K Spec.	Newsoft	Adven.	*
Black Hole	16K Spec.	Quest	Arcade	6
Blind Alley	16K Spec.	Sunshine	Arcade	7
Brain Damage	48K Spec.	Silversoft	Arcade	*
Breakaway	16K Spec.	Procom	Arcade	*
Brewery	48K Spec.	P Boulton	Strat.	*
Bridge Master	16K Spec.	Bridgemaster	Education	*
Bridge Master	16K ZX-81	Bridgemaster	Education	*
Bridge Tutor	16K Spec.	CP	Mind Game	*
Business Bank Account	48K Spec.	Transform	Business	*
Business Bank Account	16K ZX-81	Transform	Business	*
Byter	16K ZX-81	Protek	Arcade	*
Calpac 1	16K Spec.	Calpac	Education	*
Calpac 2	16K Spec.	Calpac	Education	*
Calpac 3	16K Spec.	Calpac	Education	*
Calpac 1	16K ZX-81	Calpac	Education	*
Calpac 2	16K ZX-81	Calpac	Education	*
Castle Colditz	48K Spec.	Felix	Adven.	*
Castle Colditz	16K ZX-81	Felix	Adven.	*
Caterpillar	16K Spec.	CDS	Arcade	*
Character Gen	16K Spec.	Spectrasoft	Utility	*
Children's Compendium	16K Spec.	Dymond	Game	*
Collector's Pack	48K Spec.	Sinclair	Business	7
Colossal Caves	48K Spec.	CP	Adven.	*
Compiler	48K Spec.	Softek	Utility	6
Composer	48K Spec.	Contrast	Utility	*
Conflict	48K Spec.	Martech	Strat.	*
Conflict	16K ZX-81	Martech	Strat.	7
Countabout	48K Spec.	Longman	Education	*
Countries of the World	16K Spec.	Hewson	Utility	8
Cosmic Guerilla	16K Spec.	Crystal Comp	Arcade	8
Cosmos	16K Spec.	Abbex	Arcade	7
Copycat	1K ZX-81	Copycat	Utility	*
Counting	16K Spec.	Starter Soft	Education	*
Counting	16K Spec.	Widget	Education	*
Crevasse and Hotfoot	16K Spec.	Microsphere	Games	7
Critical Path Analysis	48K Spec.	Hilderbay	Business	*
Critical Path Analysis	16K ZX-81	Hilderbay	Business	6
Cruising	16K Spec.	Sunshine	Arcade	4
Cyber Rats	16K Spec.	Silversoft	Arcade	7
Cycle Planner	16K Spec.	Medidata	Utility	4
Dallas	16K Spec.	CCS	Sim.	6
Dallas	16K ZX-81	CCS	Sim.	6
Database	48K Spec.	Microl	Business	7
Demolition	16K ZX-81	Comp. Rntls.	Game	*
Derby Day	48K Spec.	Comp. Rntls.	Game	*
Destroyer	16K Spec.	Winters	Game	*
Devils of Deep	48K Spec.	Shephard	Adven.	*
Dictator	16K Spec.	Bug Byte	Strat.	*
Dietron	16K Spec.	Custom	Utility	6
Disassembler	16K Spec.	dK' Tronics	Utility	7
Display	16K Spec.	Work Force	Utility	*

Name	Machine	Company	Type	Gilbert factor
DIY Book-keeping	48K Spec.	RAMTOP	Business	*
DLAN	48K Spec.	Campbell	Utility	*
Do Not Pass Go	48K Spec.	Work Force	Strat.	6
Do Not Pass Go	16K ZX-81	Work Force	Strat.	*
Draft	16K ZX-81	Myrmidon	Business	*
Draughts	48K Spec.	CP	Mind Game	*
Dungeons of Doom	16K ZX-81	Woosoft	Adven.	*
Dungeon Master	48K Spec.	Crystal Comp.	Adven.	8
Dymonoids	16K Spec.	Dymond	Game	*
Editor/Assembler	16K Spec.	Picturesque	Utility	8
Educational	16K Spec.	Startersoft	Education	*
Engine Diagnostic	48K Spec.	Spectrasoft	Utility	*
Escape	16K Spec.	New Generation	Maze	8
Espionage Isl.	48K Spec.	Artic	Adven.	5
Espionage Isl.	16K ZX-81	Artic	Adven.	*
Ext	48K Spec.	Abbex	Arcade	6
Everest Ascent	48K Spec.	Shepard	Adven.	6
Evolution	48K Spec.	Microsphere	Game	*
Family Games Pack	16K Spec.	Hornby	Game	*
Farmer	16K Spec.	CCS	Sim.	*
Farmer	16K ZX-81	CCS	Sim.	*
Faust's Folly	16K Spec.	Abbex	Adven.	6
Fighter Pilot	16K ZX-81	Digital Int.	Sim.	5
Finance Manager	16K Spec.	OCP	Business	9
Firework Music	16K Spec.	Soft Cottage	Education	*
Flight Sim.	48K Spec.	Sinclair	Sim.	6
Flight Sim.	16K ZX-81	Sinclair	Sim.	6
Football	16K Spec.	Winters	Sim.	*
Football Manager	48K Spec.	Addictive Gms.	Sim.	7
Football Manager	16K ZX-81	Addictive Gms.	Sim.	*
Forth	48K Spec.	Abersoft	Language	9
Forth	48K Spec.	Sinclair	Language	7
Forth	16K ZX-81	Sinclair	Language	7
Four Rules of Number	16K Spec.	Micro Master	Education	*
Four Rules of Number	16K ZX-81	Micro Master	Education	*
French Voc Test	16K Spec.	Tutorial	Education	*
French Voc Test	48K Spec.	Tutorial	Education	*
Froggy	16K ZX-81	DJL	Arcade	7
Froggy	16K Spec.	DJL	Arcade	7
Fruit Line	16K Spec.	P A Hanson	Game	*
Fruit Machine	16K Spec.	dK' Tronics	Game	6
Full-screen Breakout	1K ZX-81	New Generation	Arcade	*
Galaxians	16K Spec.	Artic	Arcade	6
Galaxian 5	16K Spec.	Abbex	Arcade	*
Galaxy Conflict	48K Spec.	Martech	Strat.	*
Galaxy Conflict	16K Zx-81	Martech	Strat.	8
Gangsters	48K Spec.	P Boulton	Strat.	*
Gambling Tape	16K Spec.	Dymond	Game	*
Games	16K ZX-81	P Teakle	Game	*
Games 2	16K ZX-81	JRS	Game	*
Games Tape 1	1K ZX-81	J K Greye	Game	*
Games Tape 2	16K ZX-81	J K Greye	Game	*
Games Tape 3	16K ZX-81	J K Greye	Game	*
Games Pack 1	16K Spec.	A Burnham	Game	*
Games Tape 1	16K Spec.	Sospan	Game	*
Games Tape 2	16K Spec.	Sospan	Game	*
Ghost Hunt	16K Spec.	PSS	Arcade	*
Gnasher	16K Spec.	R & R	Maze	8
Gobble-a-Ghost	16K Spec.	CDS	Arcade	*
Gobbleman	16K Spec.	Artic	Arcade	*
Gobbleman	16K Zx-81	Artic	Arcade	*
Gobbler	16K ZX-81	Software Farm	Arcade	*
Golden Apple	48K Spec.	Artic	Adven.	*
Golf	16K Spec.	R & R	Sim.	7
Golf	16K Spec.	Virgin	Sim.	8
Gorilla	16K Spec.	D Hornsby	Game	*
Grand Prix	16K ZX-81	dK' Tronics	Arcade	*
Graphics	16K ZX-81	IPA	Utility	*
Graphics Toolkit	16K ZX-81	JRS	Utility	9
Great Britain Ltd	48K Spec.	Hessel	Strat.	7
Great Britain Ltd	16K ZX-81	Hessel	Strat.	*
Greedy Gulch	16K ZX-81	Phipps	Adven.	7
Ground Attack	16K Spec.	Silversoft	Arcade	6
Ground Force Zero	16K Spec.	Titan	Arcade	*
Gulp 2	16K ZX-81	Campbell	Arcade	*
Gulpman	16K Spec.	Campbell	Arcade	*
Halls of Things	48K Spec.	Crystal Comp.	Adven.	9
Hanoi King	48K Spec.	Contrast	Mind Game	*
Heathrow	16K Spec.	Hewson	Sim.	8
Hidden Letters	16K Spec.	Poppy	Education	*
High Noon	48K Spec.	Work Force	Arcade	9
High-resolution Graphics	1K ZX-81	P Moody	Utility	*
High-resolution Invaders	16K ZX-81	Odyssey	Arcade	*
Hitch Hikers' Guide to the Galaxy	48K Spec.	ESP	Adven.	6
Hobbit	48K Spec.	Sin/M.Hse.	Adven.	9
Horace and the Spiders	16K Spec.	Sinclair	Arcade	8
Horace Goes Skiing	16K Spec.	Sinclair	Arcade	8
Hot Dot Spotter	16K Spec.	Longman	Education	*
Hungry Horace	16K Spec.	Sinclair	Arcade	8
I Ching	48K Spec.	Sirius	Game	*
Inca Curse	48K Spec.	Sinclair	Adven.	6
Inca Curse	16K ZX-81	Sinclair	Adven.	*
Inkos	48K Spec.	Chalksoft	Sim.	*
Integration	16K Spec.	University	Utility	8
Integration	16K ZX-81	University	Utility	8
Intermediate English 1	16K Spec.	Rose	Education	*
Intermediate English 1	16K ZX-81	Rose	Education	*
Intermediate English 2	16K Spec.	Rose	Education	*
Intermediate English 2	16K ZX-81	Rose	Education	*
Intermediate Maths 1	16K Spec.	Rose	Education	*
Intermediate Maths 1	16K ZX-81	Rose	Education	*
Intermediate Maths 2	16K Spec.	Rose	Education	*
Intermediate Maths 2	16K ZX-81	Rose	Education	*
Invaders	16K ZX-81	Abersoft	Arcade	*
Invaders	16K ZX-81	Bug Byte	Arcade	*
Invaders	16K ZX-81	Silversoft	Arcade	*
Invasion Force	16K Spec.	Artic	Arcade	8
Jackpot	48K Spec.	Comp. Rntls.	Arcade	*
Johnny Reb	48K Spec.	Lothlorian	Sim.	*
Keysounder	16K Spec.	S and G	Utility	*
The Key	16K Spec.	Keysoft	Utility	*
Knight's Quest	48K Spec.	Phipps	Adven.	6
Knight's Quest	16K ZX-81	Phipps	Adven.	*
Krackit	16K Spec.	Artic	Adven.	4
Krackit	16K ZX-81	Artic	Adven.	4
Labyrinth	16K Spec.	Axis	Arcade	4
Language Devel. Series	16K Spec.	Glasson	Education	*
Language Devel. Series	16K ZX-81	Glasson	Education	*
Language Devel. Series	16K ZX-81	Micro Master	Education	*
Language Devel. Series	16K Spec.	Micro Master	Education	*
Lazatron	48K Spec.	Contrast	Arcade	*
Leap Frog	16K Spec.	CDS	Arcade	*
Learning Read 1	16K Spec.	Poppy	Education	*
Linear Progging	16K Spec.	University	Utility	*
Linear Progging	16K ZX-81	University	Utility	*
Lost Island	16K ZX-81	JRS	Adven.	*
Machine Code Test Tool	16K Spec.	OCP	Utility	7
Machine Code				

THE BEST SOFTWARE ON EARTH COMES FROM PSION.



Psion is the source for the best software programs you'll ever see on a Sinclair Spectrum.

Our range runs rings round other software. In short, it's faster, livelier and more colourful.

Why?

Ideas. At Psion, they're bigger and more ambitious.

We combined a 12,000-word dictionary with complex logic – and the result is spectacular: our Computer SCRABBLE® program. Then there's the 'Horace' series...

It's all down to programming skill. Flight Simulation – a 'real-time' program – is a special breakthrough in this field. Few other programs make such full use of your Spectrum's capabilities.

In all, there are 12 challenging titles, published exclusively under the Sinclair label. (Not counting the free 'Horizons' cassette that introduced you to your computer.)

Psion programs for the Spectrum:

- Flight Simulation (48K)
- Chess (48K)
- Space Raiders
- Planetoids
- VU-CALC
- VU-FILE
- VU-3D (48K)
- Hungry Horace
- Horace and The Spiders
- Horace goes Skiing
- Backgammon
- Computer SCRABBLE® (48K)

'Horace' series produced in conjunction with Melbourne House.
SCRABBLE® trademark and copyright licenced by Scrabble Schutzrechte und Handels GmbH – a J. W. Spear and Sons PLC subsidiary.

Unbelievable? A recent W H Smith chart of best-selling Spectrum programs speaks for itself. No less than 7 of the top 12 cassettes are by Psion. And there's more to come. Watch out for our very latest program, 'Chequered Flag.'

In fact, if you're choosing software for your Spectrum, there's just one way to find the best...

Look for the Psion symbol on the cover of the cassettes.

PSION

Name	Machine	Company	Type	Gilbert factor
Test Tool	16K ZX-81	OCP	Utility	*
Mad Martha	48K Spec.	Miko-Gen	Adven.	7
Magic Mountain	16K ZX-81	Phipps	Adven.	*
Mailing List	16K ZX-81	Hestacrest	Business	*
Masterfile	48K Spec.	Campbell	Business	8
Masterfile 16	16K Spec.	Campbell	Business	*
Matcalc	16K Spec.	Work Force	Utility	*
Maths Tutor	16K Spec.	AD Software	Education	*
Matrix Operations	16K ZX-81	University	Utility	7
Matrix Operations	16K Spec.	University	Utility	7
Maze Chase	16K Spec.	Hewson	Arcade	8
Maze Death Race	48K Spec.	PSS	Arcade	*
Maze Death Race	16K ZX-81	PSS	Arcade	*
Maze Man	16K ZX-81	Abersoft	Arcade	*
Maziacs	48K Spec.	dK' Tronics	Arcade	8
Mazogs	16K ZX-81	Bug Byte	Arcade	*
MCoder	16K Spec.	PSS	Utility	*
MCoder	16K ZX-81	PSS	Utility	*
Merchant of Venus	16K ZX-81	Crystal	Adven.	7
Meteoroids	16K Spec.	dK' Tronics	Arcade	*
Meteoroids	16K Spec.	Softek	Arcade	6
Meteor Storm	16K Spec.	Quicksilva	Arcade	7
Micropen	16K Spec.	Contrast	Utility	*
Mined Out	16K Spec.	Quicksilva	Arcade	7
Mines of Saturn/ Return to Earth	16K Spec.	Mikro-Gen	Adven.	*
Money	16K Spec.	Poppy	Education	*
Muncher	16K Spec.	Silversoft	Arcade	*
Muncher	16K ZX-81	Silversoft	Arcade	*
Namtir Raiders	16K ZX-81	Artic	Arcade	8
Night Gunner	16K ZX-81	Digital	Sim.	5
NightFlite	16K Spec.	Hewson	Sim.	5
Nowotnik Puzzle	16K Spec.	Phipps	Game	7
Nowotnik Puzzle	16K ZX-81	Phipps	Game	*
Odds-on	16K Spec.	RSD	Game	*
O Level Chemistry	48K Spec.	Calpac	Education	*
O Level Chemistry	16K ZX-81	Calpac	Education	*
O Level Fench Revision	16K ZX-81	Rose	Education	*
O Level Maths Revision	16K ZX-81	Rose	Education	*
O Level Physics	16K Spec.	Homestudy	Education	*
O Level Physics	48K Spec.	Think Tank	Education	*
Omnicalc	48K Spec.	Microsphpere	Business	9
Orbiter	16K Spec.	Silversoft	Arcade	7
Original Superchess	48K Spec.	CP Software	Tradtitional	*
Original Superchess	16K ZX-81	CP Software	Traditional	*
Ostron	16K Spec.	Softek	Arcade	*
Othello	16K Spec.	CP Software	Traditional	*
Othello	16K Spec.	M.O.I.	Traditional	*
Othello	16K ZX-81	M.O.I.	Traditional	*
Pathfinder	16K Spec.	Widget	Education	*
Payroll	48K Spec.	Hilderbay	Business	9
Payroll	16K ZX-81	Hilderbay	Business	*
Payroll	32K ZX-81	Soft Tech	Business	*
Payroll	48K ZX-81	Soft Tech	Business	*
Peek	16K Spec.	Zen	Utility	*
Penetrator	48K Spec.	Mel. Hse.	Arcade	7
Personal Banking System	48K Spec.	Hilton	Business	*
Personal Banking System	16K ZX-81	Hilton	Business	*
Pharoah's Tomb	16K ZX-81	Phipps	Adven.	*
Pilot	16K ZX-81	Hewson	Simulation	7
Pimania	16K ZX-81	Automata	Simulation	*
Pimania	48K Spec.	Automata	Simulation	7
Pinball	16K Spec.	Winters	Game	*
Planet of Death	16K Spec.	Artic	Adven.	6
Planetoids	16K Spec.	Sinclair	Arcade	8
Polynomials	16K Spec.	University	Utility	8
Polynomials	16K ZX-81	University	Utility	
Pool	16K Spec.	Bug Byte	Game	7
Pre/early school cassettes	16K Spec.	Essex	Education	*
Primary Arithmetic	16K Spec.	Rose	Education	*
Primary Arithmetic	16K ZX-81	Rose	Education	*
Print Shop	16K Spec.	CCS	Simulation	8
Print Shop	16K ZX-81	CCS	Simulation	*
Pro-Golf	16K Spec.	Hornby	Game	7
Programmer's Dream	16K Spec.	Work Force	Utility	8
Programme Enhancement Package	16K ZX-81	R and R	Utility	*
Puckman	16K ZX-81	Hewson	Arcade	*
Purchase Ledger	16K ZX-81	Hestacrest	Business	*
Quest	48K Spec.	Hewson	Adven.	6
Ramopoly	48K Spec.	J Fletcher	Game	*
Red Weed	48K Spec.	Lothlorian	Simulation	*
Regression	16K Spec.	University	Utility	8
Regression	16K ZX-81	University	Utility	*
Renumber Delete	16K Spec.	Work Force	Utility	*
Renumber Delete	16K ZX-81	Work Force	Utility	*
Rescue	48K Spec.	Computer Rent	Arcade	*
Reversi	16K Spec.	Sinclair	Traditional	8
Roulette	16K Spec.	Newsoft	Traditional	*
Roulette	48K Spec.	Dymond	Traditional	*
Sales Day Book	48K Spec.	Transform	Business	*
Sales Day Book	16K ZX-81	Transform	Business	*
Sales Ledger	16K ZX-81	Hestacrest	Business	*
Secret Valley	16K Spec.	Newsoft	Adven.	*
Secret Valley	16K ZX-81	Newsoft	Adven.	*
Self-teach Program	16K Spec.	Anvil	Education	*
Self-teach Program	16K ZX-81	Anvil	Education	*
Sentinel	16K Spec.	Abacus	Arcade	*
Serpents Tomb	16K ZX-81	Vortex	Adven.	*
The Settler	16K Spec.	BSS	Utility	*
The Settler	16K ZX-81	BSS	Utility	*
Shape Sorter	16K Spec.	Widget	Education	*
Sideways Copy	16K ZX-81	D King	Utility	*
Sheepwalk	48K Spec.	Virgin	Game	7
Ship of Doom	48K Spec.	Artic	Adven.	7
Shiva Special 1	16K Spec.	Shiva	Games	*
Shopping List	16K Spec.	SD	Utility	*
Sky Raider	16K Spec.	C M Smith	Arcade	*
Slippery Sid	16K Spec.	Silversoft	Arcade	8
Slow Loader	16K Spec.	ELR	Utility	9
Snail Logo	48K Spec.	CP	Language	*
Softalk 1	48K Spec.	CP	Utility	*
Softalk 2	48K Spec.	CP	Utility	*
Solaris	48K Spec.	Sotel	Arcade	*
Solo Whist	16K Spec.	Video Soft.	Traditional	*
Sound FX	16K Spec.	dK' Tronics	Utility	6
Space Fighter	16K Spec.	Winters	Arcade	*
Space Intruders	16K Spec.	QS	Arcade	7
Space Raiders	16K Spec.	Sinclair	Arcade	6
Space Raiders	16K ZX-81	Sinclair	Arcade	*
Space Trek	16K ZX-81	JRS	Arcade	*
Space Zombies	16K Spec.	Mikro-Gen	Arcade	*
Spanish Gold	48K Spec.	Chalksoft	Education	*
Speak and Spell	48K Spec.	S and G	Education	*
Spec. Assembler	48K Spec.	Artic	Utility	*
Spec. Bug	16K Spec.	Artic	Utility	*
Spec. Tape Copier	16K Spec.	S Giza	Utility	*
Spectadraw 2	48K Spec.	McAlley	Utility	*
Spectipede	16K Spec.	R and R	Arcade	8
Spectral Panic	16K Spec.	Hewson	Arcade	5
Spec. Compiler	48k Spec.	Softek	Utility	7
Spec. Editor/ Assembler	16K Spec.	Picturesque	Utility	8
Spec. Forth	48K Spec.	Abersoft	Language	9
Spec. Forth	48K Spec.	CP	Utililty	*
Spec. Frogs/ Showdown	16K Spec.	Artic	Arcade	*
Spec. Gobbleman	16K Spec.		Arcade	*
Spec. Invaders	16K Spec.	Artic	Arcade	*
Spec. Invasion Force	16K Spec.	Artic	Arcade	*
Spec. Microchess	16K Spec.	Artic	Traditional	*
Spec. Monitor	16K Spec.	Picturesque	Utility	8
Spec. Scramble	16K Spec.	Work Force	Arcade	7
Spec. Sound	16K Spec.	M Afzal	Utility	*

Cassette Round-up

Name	Machine	Company	Type	Gilbert factor
Spellbin	16K Spec.	Startersoft	Education	*
Spookyman	16K Spec.	Abbex	Arcade	7
Spreadsheet	48K Spec.	MICROL	Business	7
Superchess II	48K Spec.	CP	Traditional	8
Super Play I	16K Spec.	Video	Games	*
Superspy	48K Spec.	Shepherd	Adven.	5
Tai	16K ZX-81	PSS	Game	*
Tank Battle	16K Spec.	dK' Tronics	Game	8
Tape Breaker	16K Spec.	Spectrasoft	Utility	*
Tasword	48K Spec.	Tasman	Business	8
Tasworld II	48K Spec.	Tasman	Business	9
Teacheraid	16K Spec.	B Farris	Education	*
Teach Data	48K Spec.	B Farris	Education	*
Teacher Data	48K Spec.	Farris	Utility	7
Tennis	16K Spec.	Winters	Game	*
Tenpin	16K ZX-81	Phipps	Game	*
Test Match	48K Spec.	Computer Ren.	Game	*
The Orb	48K Spec.	Computer Ren.	Adven.	*
The Great Western	16K Spec.	New Soft	Game	*
The Great Western	16K ZX-81	New Soft	Game	*
Time Bandits	16K Spec.	New Soft	Adven.	*
Time Bandits	16K ZX-81	New Soft	Adven.	*
Time Gate	48K Spec.	QS	Arcade	8
Tomb of Dracula	48K Spec.	Felix	Adven.	*
Tomb of Dracula	16K ZX-81	Felix	Adven.	*
Trace	16K Spec.	Zen	Utility	*
Trace	16K Spec.	Texgate	Utility	8
Train Game	48K Spec.	Microsphere	Game	9
Transylvanian Tower	48K Spec.	Shepherd	Adven.	*
Troon	48K Spec.	Hornby	Game	8
Tube Train Terror	48K Spec.	JRS	Game	*
3D Tunnel	48K Spec.	New Gen.	Arcade	9
The Turk	48K Spec.	OCP	Traditional	8
Use and Learn	16K Spec.	MiCROL	Utility	8
Velnor's Lair	48K Spec.	QS	Adven.	8
Voice Chess	48K Spec.	Artic	Traditional	9
Volcanic Dungeon	16K ZX-81	Carnell	Adven.	*
Volcanic Dungeon	48K Spec.	Carnell	Adven.	6
Vu-Calc	16K Spec.	Sinclair	Business	7
Vu-File	16K Spec.	Sinclair	Business	8
Vu3D	48K Spec.	Sinclair	Utility	8
Warlord	48K Spec.	Lothlorian	Simulation	*
Wizard's Warriors	16K Spec.	Abersoft	Arcade	*
Word Fit	16K ZX-81	Ram Writer	Game	6
Word Processor	48K Spec.	MiCROL	Business	*
World Info	48K Spec.	Wimsoft	Utility	*
X Ray	16K Spec.	Zen	Utility	*
Yahtzi	48K Spec.	Work Force	Traditional	*
Yomp	16K Spec.	Virgin	Arcade	7
Zodiac I	16K ZX-81	Stellar	Utility	*
Zodiac II	16K ZX-81	Stellar	Utility	*
Zodiac F	48K Spec.	Stellar	Utility	7
ZXAS	16K ZX-81	Bug Byte	Utility	*
ZX-Bug	16K ZX-81	Artic	Utility	*
ZX-Chess I	16K ZX-81	Artic	Traditional	*
ZX-Chess II	48K Spec.	Artic	Traditional	*
ZX 1K Chess	1K ZX-81	Artic	Traditional	*
ZX Compiler	16K ZX-81	Silversoft	Utility	*
ZXDB	16K ZX-81	Bug Byte	Utility	*
ZX Draughts	48K Spec.	CP	Traditional	*
ZXED	16K Spec.	dK' Tronics	Utility	*
ZX Forth	16K ZX-81	Artic	Language	8
ZX Forth	48K Spec.	Artic	Language	8
ZX-81 1K Games Pack	1K ZXZ-81	Crystal	Games	9
ZX Invasion Force	16K ZX-81	Artic	Arcade	*
ZX-81 Pocket Book	16K ZX-81	Phipps	Games	*
ZX-81 Remload	16K-64K ZX-81	Picturesque	Utility	*
ZX Screenkit	4K-64K ZX-81	Picturesque	Utility	*
ZX-sideprint	16K ZX-81	Microsphere	Utility	*
Zuckman	16K ZX-81	DJL	Arcade	8

Advertisement Index

Arcade Software 155
Artic....74, 123
Abersoft 54
Addictive Games 109
AGF Hardware 22-23
Bug-Byte 7
Bridgemaster 45
Betasoft 116
Buffer Micro Shop 106
Bridge Software 111
Computer Add-ons 8-9
Crystal Computing 14, 94
Carnell Software 20-21
CCS 30
Cascade Games 35
CCI 38-39
Curran Computer Components 115
Chapman, G 134
Calpac 62
Cheetah Marketing 63
CRL 65
CP Software 69
Cambridge Computing 70
Campbell Systems 98
Compusound 102
Cambridge Computer Store 111
Datel Electronics 117
Digital Intergration 111
East London Robotics 28-29
Fuller Micro 55, 134
Fantasy Software 53
Firminger, A 62
Fountain Computers 64
F.B. Tronics 72
File Sixty 73
Fry 98
Felix 108
Fox Electronics 124-125
Greye, JK 52
Heinemann Educational 13
Hilton Computer Services 15
Hornby Software 148
Hewson Consultants 46-47
Hestacrest 59
Harley Systems 68
Hartland Software 92
Hilderbay 93
Impact Software 64
Interface 108
JRS 37
Kempston Micro 2
Kelwood Computer Cases 106
Kemp Ltd 36
Kosmos Software 117
K. Ram 52
Kernow 106
Load Runner 107
Legend....146, 147
Maplin 6
Micronet 152-153
Melbourne House 32, 33, 44, 58, 112, 132, 133
Micro Power 45
Minimal Systems 116
Micromega 130
Micromaster 59
Micha Design 64
Microsphere 92
Magenta Electronics 93
Medical Systems Ltd 98
Microl 95-97
Memotech 71
Mikro Gen 119
McAlley, BS 36
New Generation 91
Northern Computer Exhbns 15
Orwin Software 110
Odyssey Computing 52
Oxford Computer Publishing 108
Owen, TJ 14
Pan Books 15
Psion 158
Protek 42-43
Phipps Associates 122
Pitman Books 106
Pictureque 109
Print Plotter 4
PSS 163
Quicksilva 164
Reed Exhibitions....16, 103
Rose Software 148
RE Ltd 68
Rainbow 93
Richard Shepherd Software 104-105
R & R Software 109
Silversoft 10
Software Supermarket 24
Software Workshop....144, 145
Softek 27
Softeach 45
Software Library 117
Software Cottage 134
Sinclair Research....135-138
Stack Computers 62
Severn Software 72
Sunshine Books 102
Silver Fox Comms 99
Sharp 60-61
Tandy Corp 151
Texgate 151
Transform 54
Treetop Designs 59
Tutorial Software 92
Tasman Software 103
U-Microcomputers 118
Ultimate Play The Game....126-127
University Software 102
Visions 50
Widget Software 14
Winters Ltd 68
Watson Software 72
Workforce 51

sinclair supermart

GUITAR TUTOR 1
48K SPECTRUM **£4.95**
Learn to play the easy way. See and hear whether you've got it right. Takes the guesswork out of learning to play and makes it fun! Designed for beginners!

GUITAR TUTOR 2
48K SPECTRUM **£4.95**
A natural progression from Tutor 1. All you need to become a more polished musician.

CHORD DICTIONARY
48K SPECTRUM **£4.95**
See and hear all the chords you're likely to need in every key.
Also 100's of games 16 & 48K Spectrum.
Send sae for details.
Cheques/P.O.'s to:

HARLEQUIN SOFTWARE
43 OSPREY PARK, THORNBURY, BRISTOL BS12 1LY.

NEW SOFTWARE

'BEAT THE GAMES' PLAY WITH EDUCATION

New programs written by university academics for

SINCLAIR SPECTRUM 48K

Secondary level learning and revision programs in:

British History
European History
English Literature

Programs on disk for other microcomputers also available.
Write/'phone for catalogue *(no stamp required)*

Sussex Software, FREEPOST, Devizes, Wilts. SN10 1BR. Tel: Seend (038 082) 337

Bowies
The Computer People

Bowies are leading specialist suppliers of the Sinclair ZX Spectrum Personal Computers. We consider our service to those who own, or who are interested in any products in our range cannot be matched by any other supplier. Just look at what we have to offer.

★ Shop Demonstration Facilities
★ Helpfull Advice
★ Huge Range (Software, Hardware, Peripherals, Books etc)
★ Educational Specialists
★ Try Before you Buy
★ Service/Repairs—(Cheaper than Sinclair!)
★ Breakdown Insurance
★ Competative Prices
★ Mail Order—(24 hour service)
★ Easy Payment—(Visa, Access, etc)
★ Opening hours: (Sat 8.30–5.30, Tues–Fri 10.30–5.30)

Want to know more about the ZX Spectrum and the great Products and Services available at Bowies? Then write or call for our free catalogue.

56 Bradford Street, Walsall, West Midlands WS1 3SU
Why not phone your order? Tel: (0543) 371090

SPECTRUM
16K or 48K

NUMBER 6

Is your child aged 6, 7 or 8 and need a little extra tuition at Maths? The **NUMBER 6** program was written by teachers initially for school use, but now it is available to all Spectrum owners.

Prime Software
23 Beaconfield Road, Plymouth PL2 3LD

THIS'LL TEACH YOU A LESSON!!

(...or two)

GCE O LEVEL/CSE Cassettes for the **48K SPECTRUM** with COLOUR and MOVING GRAPHICS

PHYSICS 6 Programs for £6·50	✱Solids, Liquids and Gases ✱Vectors and Scalars ✱Acceleration	✱Graphs of Motion ✱Gravity, Weight and Friction ✱Newtons Laws
CHEMISTRY 6 Programs for £6·50	✱Chemical Change ✱Types of Reaction ✱Rate of Reaction	✱Chemical Combination and the Mole ✱Chemical Equilibrium ✱Energy Changes

OR BOTH for £12

Cheque/PO (payee THINK TANK) to

think tank *Educational Software*

Dept SU(N), 35 Wellington Road, Wimbledon Park, London SW19 8EQ

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

Tune your TV for optimum performance by using "TV COLOUR TUNE"—an educational and instructive program for the 48K Spectrum giving CROSS HATCH and COLOUR-BAR SIGNALS with relevant back-up of the physics of colour TV transmission

£3.75 each, or get one

FREE

with every 3 titles ordered

★ CHESS	48K ARTIC	£9.45 ★
CHESS PLAYER	48K QS	£6.95
★ TIMEGATE	48K QS	£6.95 ★
MINED OUT	48K QS	£4.95
★ STAR TREK	48K R+R	£4.95 ★
★ MICRO CHESS	16K ARTIC	£6.95 ★
GOBBLEMAN	16K ARTIC	£4.95
★ GOLF	16K R+R	£3.75 ★
SPACE INTRUDER	16K QS	£4.95
★ METEOR STORM	16K QS	£4.95 ★

★ We are now a major source of EDUCATIONAL programs ranging from INFANT to CSE/GCE. Top rate service and comprehensive supply only from:

★ **LOCATOR**, 12 Fernhall Drive, Redbridge, Essex 1G4 5BN. Tel: 01-550 5575. ★

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

ZX SPECTRUM SOFTWARE

25 Super programmes—machine code arcade games, adventures, dungeons & dragons, puzzles and ball games. Including Breakout (taking you through 9 skill levels), Star Wars, Amazing 3D Mazes, 3D Noughts & Crosses, Corridors of Doom, Trap It, Housebreak and Yahtzee. All 25 on one cassette for only £9.95.
48K ARCADE ACTION PACK — Three super fast action arcade games direct from Israel. Mission Omega, Close In and Smiley . . . All three on one cassette for only £6.95.
Both packs as above only £15.95.

SPARTAN SOFTWARE (DEPT SU)
9 Cotswold Terrace,
Chipping Norton, Oxon.

CUT YOUR HEATING BILLS

A powerful new program for the 48K Spectrum. Find out what insulation could do for your house.

*Predicts annual savings from: double glazing — insulation of solid/cavity walls, floors or roofs — change of fuel/heater/thermostat setting.
*Easy to use — mostly Y/N or mult. choice questions.
*Saves house data on cassette.
*Detailed instruction — fully error trapped.
*Written by Cambridge Engineering Graduate.

Only £7.95 inc p&p. Brane Software, Myrtle Grove, Brane, Sancreed, Penzance TR20 8RE. 073 672 462

COMPUTERISED JOGGERS DIARY

At last an automated diary for all Joggers and Athletes with access to 48K SPECTRUM computers.

Comprehensive facilities include:

— Up to 20 Routes or Events and 1,000 individual performance entries on one data tape.
— Weekly mileage analysis.
— Times, time per mile and pulse rate analysed by Route between specified dates.
— Excellent graphical output.
— Comprehensive hard copy facilities.
— Menu driven, very friendly and much more.

Send cheque/P.O. for £6.95 to L. Chantler, 34 Green End Street, Aston Clinton, Bucks, HP22 5JE.

EAST MIDLAND SOFTWARE

CARIBBEAN TRADER 48K SPECTRUM £4.95

The trading game for the cunning business-like mind

BALTIC PATROL (16/48K SPECTRUM specify type) £4.95. Arcade style game, progressive levels of difficulty. Subs, helicopters, torpedoes, mines, bombs, missiles. Amazing graphics. A game of skill and co-ordination

KING ARTHUR 48K SPECTRUM £4.95

Witty union simulation, various levels of industrial action

WHO DARES WINS 48K SPECTRUM £4.95

An exciting SAS chase adventure, set in the Argentine

All games supplied on quality cassettes.

Send Cheques and PO's to
East Midland Software, Sales Dept,
54 Ryecroft Street, Stapleford, Notts NG9 8AX

POOLS PREDICTION

"POOLSWINNER"

The most sophisticated Pools Prediction Aid available. Gives probabilities of score draws, draws, homes or aways, based on two databases holding over *20,000 matches* (included).
The databases are automatically updated as results are entered.
Can be used in simple mode, or with parameter adjustments to develop your own unique forecast method.
Fully documented, available now for Apple, Spectrum (48K), Dragon, ZX-81 (16K) (others—please enquire)
£15.00 (discs/tapes)

"POOLSDATA"

Complete record of all English Football League matches 1978–83. Teams, scores and dates of 10,000 matches held in simple format, ready for your analysis. Starter analysis programs and full documentation included. Available for Apple Spectrum, ZX-81, BBC, Dragon, Commodores series

Discs (5 year) £15.00
Tapes (5 year) £12.50
Tapes (2 year) £7.70
all prices (p&p included)

SELEC SOFTWARE (SU)
37 Councillor Lane,
Cheadle, Cheshire
061-428 7424

HOME STUDY LTD.

PROGRAMS AND DETAILS FROM:
TRELEIGH WOODS FARM
REDRUTH CORNWALL

48K SPECTRUM
PHYSICS 'O' LEVEL A.E.B. Syllabus 052 1983/4

8	TEACHING PROGRAMS (including games) C30 (EXCELLENT FOR ALL SYLLABUSES)		£8.40
8	PAPER 1 (multiple choice) PROGRAMS 400 questions	(C30)	£5.15
13	PAPER 2 (practical) PROGRAMS 39 questions	(C30)	£5.15
8	PAPER 3 (theory) PROGRAMS 128 questions	(C30)	£5.15

All programs feature instant answers, instant explanations, probable grade estimate.
WHEN YOU BUY THE COMPLETE SET (2 × C60) £22.00

WE GUARANTEE YOUR EXAMINATION SUCCESS
OR WE WILL REFUND THE FULL PURCHASE PRICE

SELEC SOFTWARE

ZX-81 MACHINE CODE SPECIALISTS

1K ZX-81 GAMES
THE BEST AVAILABLE

	TICK
• MAZE GUZZLER/SUPERBREAKOUT Superb Full Feature maze-chaser game, plus big-screen Breakout. **£4.50**	☐
• THE INVADERS/TIMEBOMB Original space invaders, plus a new spine-chilling game. **£4.50**	☐
• ZX-PANIC/ZX-SQUASH Two new big screen all action games. **£4.50**	☐
• FREE CATALOGUE	☐

Please send the items ticked to:

Name
Address
.....
.....

I enclose cheque/PO for £.....

SELEC SOFTWARE
37 Councillor Lane,
Cheadle, Cheshire
061-428 7425

ANVIL COMPUTING

SUPERB NEW SELF TEACH PROGRAM

For ZX-81 (16K), Spectrum. TRS80. Video Genie.

★ Now you can learn basic fast and efficiently ★
★ Forget your past programming problems. This program will make it all clear ★

★ ★ ★ ★ ★ ★ ★

Cover Arrays, Sorting, Searching, Counting, Decision making tests, Error Trapping, Menu driving etc. You start with short simple programs and build up to full working programs with everything explained in full, precise detail.

★ ★ ★ ★ ★ ★ ★

★ This is *NOT* a program you simply copy and run. ★
★ ★ *YOU HAVE GOT TO WORK!!* ★ ★
But it is written in such a way that you can not get stuck.

★ ★ ★ ★ ★ ★ ★

This program has been fully tested over the past six months by 50 domestic and small business users and we have not received any adverse reports.

★ ★ ★ ★ ★ ★ ★

This program is our own product and is not available from any other source. Full money back guarantee. **£4.75** incl. Postage & Packing (state which computer).

51 Whitcliffe Lane, Ripon, Yorks HG4 2LB.

IMPORTANT NOTICE

Unfortunately an error was published in Softek's August Advertising. Softek does not guarantee a full refund should a program fail to load, however, it does guarantee a replacement cassette.

Dr T. Langdell
SOFTEK
INTERNATIONAL LTD

The rate for classified advertising in the

sinclair supermart

is only £9.00 per single column centimetre.

To advertise in the **Sinclair Supermart,** call Annette on (01) 359 3525 **NOW!**

PROGRAMMERS

We urgently require good quality software for the ZX Spectrum. For the right kind of material we offer — Expert presentation — Improved market penetration — World-wide distribution — Total distribution in the UK and a high 25% Royalty.

SPARTAN SOFTWARE
9 Cotswold Terrace,
Chipping Norton, Oxon.

SWAG
+VOYAGER for 16K ZX81
2 Top Games on 1 Tape—Only £2.95

SWAG — Dodge the cops and rob the bank in this exciting COPS 'N' ROBBERS game.

VOYAGER — Twist through every obstacle thrown at you then destroy the Empire.

HOWARD SOFTWARE
20 Pantycelyn, Fishguard,
Dyfed SA65 9EL

PERSONAL FINANCIAL MANAGEMENT SYSTEM

A serious financial application for 48K Spectrum

*5 accounts and 26 expenditure categories each with balance enquiry, detailed statements for variable periods, full update facility.
*Sophisticated standing orders, featuring: variable payment intervals; transfer between accounts; any number of payments; fully updateable.
*Fully menu drive + user friendly.
*Data stored on external tape file.

£7.95 incl p&p

*Cheques to FULWOOD SOFTWARE (Dept S), 20 Templestowe Hill, Whitkirk, LEEDS LS15 7EJ

SPECTRUM TOOLKIT

Written in machine-code for 48K model. Includes fast and full renumber, find and change strings, block move, copy and delete, variable name lister. £5.95 including P&P.

J. A. WHITING
Claremont, 46 Hillside Grove,
Chelmsford CM2 9DA.
Tel: Chelmsford (0245) 354942.

ZX81 SPECTRUM, DRAGON, BBC AND VIC SOFTWARE LENDING LIBRARY

We have for hire from 50p (inc. post) programs for your computer.

£5 life membership (less than the cost of a single game) brings you the SOFTWARE LENDING LIBRARY membership kit, catalogue and news letter.

Send cheque or PO for £5 to:
SOFTWARE LENDING LIBRARY
PO Box 3, Castleford, West Yorks
Stating name, address and computer type.
All tapes used with manufacturers' permission

BANK ACCOUNT
48K SPECTRUM
AS REVIEWED IN SINCLAIR USER 18
PLUS ANALYSIS OF PAYMENTS

Auto Standing Order, Full Screen Online Update, Screen Enquiry, Statement Print with easy to use Online Manual.

£4.00 **K. J. Gouldstone**
45 Burleigh Avenue
Wallington, Surrey SM6 7JG

DISCOUNT SOFTWARE
Spectrum ZX81. Discounts up to 25%!

		RSP	Our Price
The Hobbit	Melbourne	14.95	11.99
Zzoom	Imagine	5.50	4.25
3D Tanx	DK'Tronics	4.95	3.70
Kong	Ocean	5.90	4.60

55p p&p 1 Tape,
2 or more Cassettes Post Free.

SAE for Full Discount Lists:
Discount Software,
45 Brunswick, Bracknell, Berks.

SPECTRUM OWNERS (16K/48K) with children, a simple yet effective program that makes tables fun to learn. Suitable, infants or juniors £3.50 inc, P&P. P. J. Hubbard, 109 Waltham Avenue, Hayes, Middx UB3 1TD.

MONEY OFFERED for your unwanted Spectrum games tapes (not copies). Wanted ZX81 — must be cheap. Please apply with sae to J. Bowley s.u. c/o 136 Lancaster Drive, Hornchurch, Essex RM12 5SL.

SPECTRUM STOP. Amazing cassette lets you stop and look at machine code programs. Order as Study 1, £3.95. ZX-Guaranteed (Office S1), 29 Chadderton Drive, Unsworth, Bury, Lancs.

48K SPECTRUM LISTFILE. Holds up to 600 names/addresses, etc. Machine code search finds any in one second. £5.00. ZX-Guaranteed (Office S1), 29 Chadderton Drive, Unsworth, Bury, Lancs.

'BUDGET' ACCOUNTING on 48K Spectrum. User-friendly. Interesting features. Many applications in home or office. £8.95. Demonstration tape for £1 (refundable). **Womack Computer Systems,** 50 Beech Close, Clayton-le-Dale, Blackburn, Lancs.

TEST MATCH. Captain England against World XI. Select strokes, bowlers, field-placings, etc. Run-rate, bad weather. 40 overs innings both sides. Realistic. ZX-81—16K. £3.95. Bosoft, Lynbrook, Borth, Dyfed.

ZX-81 PLUS RAM Pack and printer £65. Also 48K Spectrum. £85. Tel: 021-358 5539 (evenings).

SPECTRUM SOFTWARE for sale. Spectres, Inca Curse, Timegate, £3.50 each. Planetoids, Leapfrog, Hungry Horace, Space Raiders, £2.50 each. Games 1 (ICL), Golf (R&R). £1.50 each. Tel: Cardiff (0222) 41993.

HI-RES PACK, Memoteny, original packing, £20 ono. Write to Steven Mai, 102 Sutton Court Road, Chiswick, London W4 3EQ or telephone (mornings only), 01-747 3058.

16K ZX-81 plus green screen and over £25 of software including Football Manager and Sorcerer's Island, in all, worth over £90. Bargain at £45. Tel: Crieff (0726) 3615.

ZX-81 16K RAM 4K graphics ROM, DK'Tronics. Keyboards all leads, manaual, over 30 games, Frogger, Pacman, Asteroids, etc. Good condition, magazines etc. Worth £200, bargain at £85. Ideal Xmas present. Tel: 0373 822504.

HARDLY USED 48K software games for sale all going cheap will post for 50p extra charge ring: Kings Langley 67392 for details. Games include Black Crystal, 3D Tank etc.

PRINT MONEY with your Spectrum! Unsually generous royalties paid for good Spectrum software. Send cassette and S.A.E. to: Tantek Services, P.O. Box 54, Stevenage, SG2 9DQ. No arcade games please.

PERSONAL CASH flow modelling on 48K Spectrum. Forecast income and expenditure and avoid incurring the wrath of your bank manager. Monthly account statements. £8.50. ANDIC, 17 Gypsy Lane, Marlow, Bucks.

16K ZX-81, with case, power supply leads, good as new. £50 worth of games, including; Frogger, Flight Simulation, Fantasy Games and many more. Fantastic value at £75. Tel: Loxwood 752121.

SPECTRUM 48K with printer, boxed, plus ultraviolet assembler. Tape and books on games and graphics. £140. Emsworth (02434) 71879.

16K SPECTRUM. 'Ski' down mountain avoiding trees collecting money, progressive difficulty, two versions with hi-scores. Play pontoon against Spectrum. Design UDGs. One tape £2. Fossage Software, Fosse Cottage, Nettleton Chippenham.

COSMIC CAPERS exciting game for ZX-81. 99 levels, Angels versus Devils. For 16K machine, £3.95. BCG Systems, 119 Great Mistley, Basildon, Essex.

16K ZX-81 with leads and manual. As good as new, with £20 worth of games cassettes and books. £50 o.n.o. Tel: (01) 802 4647 (evenings).

16K ZX81 good condition, many games, incl 3D Monster Maze, Space Invaders, Pac-Man etc, two book + manual, bargain at £36. Tel: Wok 65578. Working B & W TV incl.

WANTED "DCODER" by P.S.S. (no longer available). A Jaques, 47 Newstead Road, Urmston, Manchester. 061-747 6201.
9422 Sinclair User (Nov '83)

PAGEPRO SYSTEM FOR SPECTRUM 48K. Stores/processes pages of information with many uses. £5.95 from SO Systems(SU), PO Box 24, Hitchin, Herts. SAE for our full catalogue of ZX Utility Software.

SPECTRUM SOFTWARE available for swapping. Over 100 cassettes. Send your game, with name of game you want, on cassette to: Mark Murphy, Windermere, Cherrywood Rd, Loughlinstown, Co Dublin, Eire.

16K ZX-81; Zon X-81; Keyboard; £90 worth of software; 30 hour basic and 15 mags. Good condition worth approx. £200! Offers please. Telephone 0726 2595 after 4.00 pm with offer. James Pearce, 10 Gannet Dr, St. Austell, Cornwall PI25 3BD. Tel: 0726 2595.

I WOULD LIKE A PEN FRIEND who owns a Spectrum with whom I can exchange programs. Ramon Macia Riu, Torregassa, No 40, Solsona (Lérida), Spain.

48K SPECTRUM (m/c). DEATHWISH: You're a soldier patrolling hostile streets. Terrorist or mother and child? You've got an instant decision, hesitate and you're dead. FROGS IN SPACE: Keep the greedy Superfrogs from bursting through the Rainbow and gobbling up the Earth's gold. MACHINECODE MONITOR: Powerful, full spec. programming tool. £4.99 each including p&p. MERLIN SOFTWARE, 61 Stamfordham Rd, Fenham, Newcastle.

Reach an estimated readership of over 200,000 users per month for as little as £2.00*.

Or if you are starting your own small business advertise in the supermart for only £10.00.

Yes all you have to do is fill in the coupon below including your name, address and/or telephone number and send to: Supermart, Sinclair User, ECC Publications, 196-200 Balls Pond Road, London N1 4AQ.

Maximum 30 words.

Your advert will appear in the earliest possible edition.

Name

Address

..... Tel:

Have you included the fee of £2.00 or £10.00?

***for second hand sales only**

Conditions
The Advertisement Manager reserves the right to alter, reject or suspend an advertisement without assigning any reason. Advertisements are accepted subject to approval of copy and to the right of the Advertisement Manager to alter, reject or cancel any order without explanation. The Proprietors are not liable for any loss from any cause whatever, nor do they accept liability for printers' errors. The Advertisers shall indemnify the Publishers in respect of any claim, cost and expenses arising out of any libellous or malicious matter or untrue statement in any advertisement published for the advertisers, or any infringement of copyright, patent or design therein. The placing of any order will be deemed to be an acceptance of these conditions.

MAIL ORDER PROTECTION SCHEME

Advertisements in this magazine are required to conform to the British Code of Advertising Practice. In respect of mail order advertisements where money is sought in advance of the despatch of goods the Code requires the advertiser to despatch goods within 28 days, unless a longer period is stated. Where goods are returned to an advertiser, undamaged, within 7 days, the purchaser's money must be refunded, plus the cost of returning the goods. The reader should retain evidence of despatch.

If you order goods from mail order advertisements in this magazine and pay in advance of delivery you will be considered for compensation under the Scheme if the advertiser becomes insolvent or ceases to trade provided that:

(a) you have not received the goods, or a refund in respect of returning same, AND:

(b) you write to the Advertisement Manager of this magazine, stating the facts, not earlier than 28 days from the date of the order and NOT LATER THAN THREE MONTHS from the date on which the advertisement appeared.

THE SCHEME ONLY COVERS ADVANCE PAYMENT SENT IN DIRECT RESPONSE TO AN ADVERTISEMENT IN THIS MAGAZINE. IT DOES NOT COVER:—

(a) Classified advertising;
(b) payment made in response to catalogues, brochures, etc. received as a result of responding to such advertisements;
(c) advertisers offering services as opposed to goods,
(d) claims where payment is made with Access or Barclaycard and where the cost of the goods is over £30. In this case claims should be made to the Credit Card Company concerned.

Full details of the Scheme are available by sending a stamped and addressed envelope to Mail Order Protection Scheme, Newspaper Publishers Association Limited, 6 Bouverie Street, London EC4Y 8AY.

PANIC

"It must be a nightmare" he screamed as he ran around the maze of floors, desperately climbing ladders to different levels in a vain attempt to evade the monsters.
He had only his neutron hammer to dig holes for the vile creatures to fall into, but even then he had to repeatedly hit them before they dropped to their deaths. As if that wasn't bad enough, the oxygen supply was running out!
"It's simply impossible" he wailed as the monsters advanced on all sides. .

SPECTRUM 48K
£5·95



Arcade Action For Spectrum, & ZX81

MAZE DEATH RACE

Drive your 500b.h.p. racing car around a giant maze (9 times the size of the TV screen on the ZX81 version, 32 times for the spectrum). Watch out for the hazards – oil, ice, fallen rocks etc. Not the least of your worries are the chase cars also in the maze – one touch with these means instant death!

ZX81 16K 3·95
SPECTRUM 48K 4·95



KRAZY KONG

Can you rescue Jane from the evil clutches of KRAZY KONG? Fight your way through three screens of fire-balls, barrels and conveyor belts to the top of the girders and save the damsel in distress. Entirely written in machine code to give super fast arcade action.

ZX81 16K 3·95
SPECTRUM 48K 5·95



ELEKTRO STORM

Earth is under attack from wave after wave of intergalactic missiles – your mission is to blast them out of the sky with your laser cannon before the whole human race is wiped out.

SPECTRUM 48K 5·95



PSS

HOPPER

Help FERGUS and his friends across the highway avoiding the traffic, and then over the treacherous river on the backs of turtles and logs to the safety of the lilly pond.
Features include: 6 lanes of traffic, diving turtles, croco-diles & flies.

ZX81 16K 3·95
SPECTRUM
16K 48K 5·95



LIGHT CYCLE

The MASTER CONTROL PROGRAM has ordered you to race your light cycle on the infamous grid. This is an incredibly fast, adrenalin pumping game that is very addictive. There is an option to race against either another player or the computer – but we warn you its very very good!

SPECTRUM
16K 48K 5·95



FOR INSTANT CREDIT CARD SALES TEL (0203)667556. SEND CHEQUE OR P.O. TO P.S.S. 452 STONEY STANTON RD. COVENTRY CV6 5DG.
TRADE ENQUIRIES CONTACT JOHN FLETCHER, COVENTRY (0203) 81346

UNBELIEVABLE SOFTSOLID 3D ANT ATTACK

MADE ON EARTH

SUPPLIED TO SENTIENT BEINGS THROUGHOUT THE UNIVERSE

COMMODORE 64 GAMES

QUINTIC WARRIOR
Stand alone against Sinister Crabmen and Mangled Mutants.
Author: T. P. Watts.

RING OF POWER
Search thru' the kingdom for the mystical ring.
Graphics/Text Adventure.
Commodre 64.
Authors: Fred Preston & Bob McClemont.

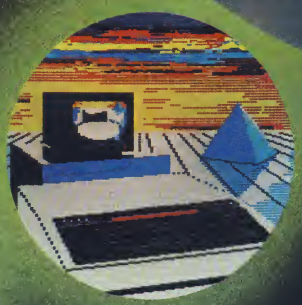


AQUAPLANE
Ski thru' Marine Maniacs but beware the deadly snapping Sharks.
Commodore 64 (Joystick or Keyboard).
Designer: John Hollis & Programmer Steve Hickman.

PURPLE TURTLES
Turtle bobbing with the cute Purpilius Turtiliorum.
Commodore 64 (Joystick or Keyboard).
Authors: Mark & Richard Moore.







SPECTRUM GAMES

VELNOR'S LAIR (Adventure)
Battle of Denizens of the Goblin Labyrinth and the Evil Wizard Velnor.
Spectrum 48K.
By Derek Brewster of Neptune Computing.

BEEB-ART
High Quality Art/Design program for versatile manipulation of the BBC's graphics ability.
BBC model B 32K.
Author: Dave Mendes.

THE GENERATORS
Superb Character + Teletext Utility.
BBC model B 32K.
By the author of Beeb-Art: David Mendes.

BBC PROGRAMES

MINED-OUT
Save Bill The Worm from Certain Death.
BBC model B 32K.
(1·0 + 1·2 operating systems only).
Authors: I. Andrew & I. Rowlings.



SMUGGLERS COVE
You are caught in a fable full of horror and Black Beard's Treasure . . .
Spectrum 48K.
Author: John Keneally.

TRAXX
Pilot your way thru' the Grid.
Spectrum 48K
Designer: Jeff Minter.

GRIDRUNNER
Spectrum version of VIC 20 No. 1 best seller.
Spectrum 48K (16K).
Designer: Jeff Minter.

AQUAPLANE
Aquatic Action!
Spectrum 48K.
Author: John Hollis.

XADOM
Battle through a sophisticated alien maze on this Arcade/Adventure.
Spectrum 48K.
Author: Mike Muscoff.



3D STRATEGY
A battle of Nerves and Wits. Faster than a speeding bullet!
Spectrum 16K.
Author: Freddy Vachha.

BUGABOO (THE FLEA)
No fleas on This Program!!
Itchy Action!!
Spectrum 48K
Author: Indescomp.



SOFTSOLID 3D ANT ATTACK
Battle the ants in the walled city of Antescher.
Spectrum 48K.
Authors: Sandy White

URGENT
Join the QUICKSILVA Game Lords Club send for details

QS™

THE GAME LORDS

Quintic Warrior Commodore 64	£7.95	☐
Purple Turtles Commodore 64	£7.95	☐
Aquaplane Commodore 64	£7.95	☐
Ring of Power Commodore 64	£9.95	☐
Mined-Out BBC model B 32K	£6.95	☐
Beeb-Art BBC model B 32K	£14.95	☐
The Generators BBC model B 32K	£6.95	☐
Velnor's Lair Spectrum 48K	£6.95	☐
Smugglers Cove Spectrum 48K	£6.95	☐
Traxx Spectrum 48K	£6.95	☐
Gridrunner Spectrum 16K/48K	£6.95	☐
Aquaplane Spectrum 48K	£6.95	☐
Xadom Spectrum 48K	£6.95	☐
3D Strategy Spectrum 16K	£6.95	☐
BugaBoo (The Flea) Spectrum 48K	£6.95	☐
Softsolid 3D Ant Attack Spectrum 48K	£6.95	☐

Please send order to
QUICKSILVA MAIL ORDER:
55 Haviland Road
Ferndown Industrial Estate
Wimborne, Dorset

PLEASE SEND ME THE GAMES AS TICKED SUPPLIED ON CASSETTE

Total cheque/P.O. enclosed _____

Cheque payable to Quicksilva Limited

NAME _____

ADDRESS _____

Send S.A.E. for Catalogue. QS Games are available through Boots, J. Menzies, Smiths, Hamleys, and all leading computer stores.

CREDIT CARD TELE SALES: 0202-891774

Access VISA

WARNING: These programs are sold according to QUICKSILVA Ltd's terms of trade and conditions of sale. Copies of which are available on request.

HEAD OFFICE: QUICKSILVA LIMITED, PALMERSTON PARK HOUSE, 13 PALMERSTON ROAD, SOUTHAMPTON SO1 1LL

GSH

The Galaxy's FIRST ever computer comic!

Zooming into touchdown at W H Smiths, John Menzies and other good newsagents now and every fortnight... only 40p.

Order your copy TODAY!

Bursting with great new comic strips... exciting stories... astounding facts... big prizes... competitions... fascinating quizzes... star personalities. And that's just the start of Britain's newest, brightest, most fun-packed comic ever!

LOAD RUNNER

It's the only comic for the age of the computer – it puts the past back with the dinosaurs!



AVAILABLE NOW

and every fortnight... order your copy **TODAY.**

sinclair starter

40 QUESTIONS AND ANSWERS FOR THE NEW USER

1. What is ROM?
The word ROM means Read Only Memory. It is the type of memory in the computer which provides permanent storage for the program which runs the computer. It stores the program which will allow the user to operate in Sinclair Basic.

2. What is RAM?
RAM is another type of memory. Unlike ROM, the programs which are stored in it will be erased when the power is turned-off. The RAM is used for storing user programs and if the programmer wants to retain a program it must be put on to backing storage, such as cassette tape recorder.

3. I have had my ZX-81 for several weeks and would like to know which is the best 16K RAM pack?
Most RAM packs are the same internally but you should look for which has a good, protective plastic cover around it, such as the Sinclair. It should, if possible, be contoured to fit the back of the machine, unlike that of Sinclair. Price is also a factor and you can buy a good RAM pack for less than £20.

4. Should I upgrade my ZX-81 further or buy a Spectrum?
Present prices for second-hand ZX-81s make advertising your old machine expensive. You should also think about what you want from your machine. The Spectrum has colour and high-resolution graphics but you may not need those qualities if you use it for business. A ZX-81 with 16K RAM pack will provide reasonably good data processing and storage facilities with some of the software on the market. If you want to play arcade-

quality space invaders or need colour for graphic design, upgrade to a Spectrum would be a good idea.

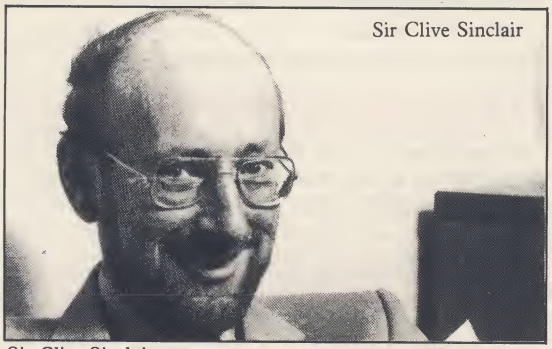
5. I have been told that certain tape recorders may not be compatible with the ZX-81. What does that mean?
The tape recorder you use with the computer needs to be able to pick up the sounds which it produces when SAVEing as accurately as possible. Some will not make a good reproduction.

6. Which tape recorders are recommended for use with Sinclair machines and if I still have problems, what can I do?
Ask retailers who sell Sinclair machines which recorders they would recommend.

If you are still having problems with LOADing and SAVEing you should try altering the volume and tone controls of the recorder. A good load is indicated with thick flashing horizontal bands across the screen when using a ZX-81. Thin bands indicate bad loading.

7. Is it true that certain colour television sets are not compatible with the Spectrum?
Several Japanese and German sets have been incompatible. In August, Sinclair altered the ULA of the Spectrum to take care of the sets which have caused the problem. The problem sets for older machines are Hitachi, Grundig and Toshiba.

8. Can I use my stereo cassette deck to put programs into my computer?



Sir Clive Sinclair

If you want to use it the recorder must have a mono tracking system. Switch to that and you should have no difficulty.

9. How can I cure RAM pack wobble?

You can stick a piece of Blu-tack between the casing of the pack and the edge of the keyboard, or you could run some tape round the pack and the connection to the keyboard. You could, however, buy a contoured RAM pack in the first place.

10. Sometimes when I am entering a program the screen display changes and I cannot enter anything else into the machine. What should I do?

Your computer has crashed and you will have to pull out the plug and start again. The fault occurs usually when the computer gets something with which it cannot cope. If it continues to happen there could be something wrong with the

machine and you should visit the dealer from whom you bought the machine for advice.

11. I have a 16K Spectrum and have tried to enter a program which uses 12K of RAM. I cannot get all the program into the computer. Why?

The computer will allow only 9K of RAM to be used for program storage. The other 7K is used for the high-resolution screen display. So you can run only 9K programs on the 16K machine.

12. Where can I buy software and what are the best places to do so?

Most electrical stores seem to sell software. The biggest of the chain stores to sell Sinclair products is W H Smith; you can buy a wide range of titles from its computer branches. Boots and Rumbelows also provide a good selection. It is best to go to the bigger stores, as they have trained sales staff to help you with a problem.

If you are looking for a specific type of product, such as a sales ledger or mailing list, you should look at reviews in magazines which give more information on what can be obtained. The reviews will also deal with mail order products which cannot be obtained from chain stores.

13. Sometimes in magazine program listings the computer is told to GOTO a line number which does not exist. Surely the program will stop with an error message?

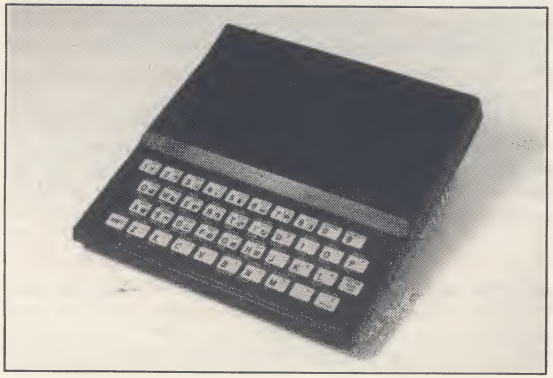
The computer will ignore the problem and continue execution

from the program line after the non-existent one. The difficulty is caused because the programmer has changed some lines without changing the GOTOs to the new destination numbers.

14. I have entered a program which will not work properly. What should I do?

Compare the listing which you have, either from a magazine or which you have written, with what you have on the screen. It is easy to mis-type a line of program and not notice it immediately. If you can find the line at which the program stops, look at the type of error which could occur at that line and check any lines which could correspond to it.

For instance, if you have E OUT OF DATA you should look at the line on which the error occurs and the list of DATA



which must appear in the program. If you get a VARIABLE NOT FOUND error you should run through the program to see if the variable is defined before it is used in the error line. If it is in the paper listing and not on the screen you have found your error.

15. Which are the best cassette tapes on which to record?

The C12 and C15 cassettes which are produced especially for computers by W H Smith are the best. They are ideal because you can store a few programs on them and not waste tape. If you buy C60s you will put more programs on to one tape and have to guess where they are every time you want to use them. Most high-density, low-level noise tapes should work with the computer.

16. I have found the Spectrum manual difficult to read. Can you suggest an easier book which I will be able to understand?

One of the best books on the market about the Spectrum is *Programming Your Spectrum* by Tim Hartnell and Dilwyn Jones. It can be obtained from Interface and includes expanded explanations of all the instructions you can give to the computer.

17. I would like some technical information about the inside of my computer. How would I obtain more details?

Sinclair Research is not helpful in this respect. You should obtain books such as *20 Simple Electronic Projects for the ZX-81 and Spectrum.* This book is by Stephen Adams and can be

obtained from Interface. It contains a great deal of information about electronics. Alternatively, you could buy *Sinclair Projects,* a sister publication of *Sinclair User.*

18. I want to attach my own extensions to my Spectrum but that will involve unscrewing the back. Will that invalidate my guarantee?
Any major modifications which you do inside your Spectrum or ZX-81 will invalidate your guarantee. If, however, you take off the back to do minor alterations which can be removed at a later date it is unlikely that Sinclair Research would regard that as an invalidation.

19. We have a Spectrum at home but my child has a BBC micro at school. Can programs be transferred from one to the other?
That is not possible because the machines have different data transfer rates between the cassette recorder and the computer. The languages which the computers use are also incompatible.

20. I own a Spectrum but I want to enter a program for the ZX-81. It seems identical to the one I would use for the ZX-81. Can I use it?
Most programs written for the ZX-81 will run on the Spectrum, with three exceptions. They are that SLOW and FAST cannot be used, the graphics are different and, if the program uses PEEK and POKE, the memory locations are different.

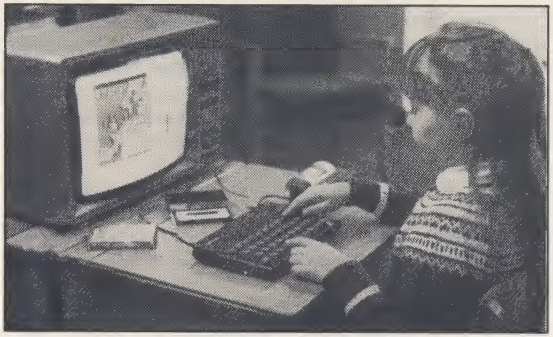
21. Is software for machines such as the Oric, Vic-20 or BBC micro compatible with Sinclair machines?

Converting listings from another machine to Sinclair computers is a very complex operation. In some cases because of the way the screen is set out and the PEEK and POKE instructions in a program it is impossible. Cassettes from other machines will not be compatible because the machine languages are different and the data transfer rates from tape to machine are incompatible.

22. I find that Basic is so slow in the execution of a program that I have been tempted to learn machine code. Could you tell me if there is a half-way stage between Basic and machine code?
You will need to use assembly language mnemonics which, with the aid of an assembler, the computer will translate into machine code. The Zeus assembler for the Spectrum can be obtained from Crystal Computing and for the ZX-81 there are plenty of machine code books on the market which teach assembler.

23. I want to learn about machine code. How can I do so?
The best way at present is from books. Buy a book which is specific to your machine if you are learning. A book which looks as if it was written for the young is the best, as many diagrams and simple text are the best to understand. The books by Dr Ian Logan from Melbourne House are excellent.

24. How do I determine if the Spectrum I have bought from a friend is 48K or 16K?
A friend may have a 48K program which he could lend you. Try to load it into the machine and if you get 4 OUT OF



MEMORY appearing on the screen after about a minute you know that the RAM size is 16K.

25. I have noticed such statements as LET A = PI/PI in program listings. What do they mean?

They are memory-saving devices which are used to cram programs into a 1K ZX-81. Numbers occupy more memory than keywords or variable names so, where possible, if a certain number is used a good deal, put it into a variable and use the variable name. The statement in question will put the value 1 into A without using any numbers directly. The PI function gives 3.14159. . . and if it is divided by itself will result in the value 1. To get zero you could use PI-PI.

26. I want to use my computer for filing purposes. Can I buy a ready-made program?

There are several of them available. Two of the best are from Campbell Systems. The Fast One is available for the 16K ZX-81 and Masterfile is available for the Spectrum.

27. I have a ZX-80 and have just bought a Spectrum. What should I do with my old machine?

You could try to sell it but there would be few buyers. The alternative is to develop electronic equipment such as burglar alarms or temperature sensors.

28. I have a computer and tape recorder. If I want to buy a peripheral, which is the most useful and which should I buy first?

Which you will buy will depend on what you want from your computer. If you want to use it for business you could buy a Centronics interface for a printer and a dot matrix printer such as the Seikosha GP-100A. If you have a ZX-81 and want to use it for business you may also need a keyboard. If all you want to do is to play games, you might buy a joystick interface and joystick.

29. I would like to buy a non-Sinclair printer for my machine. How should I look for one?

First, you will need an interface to attach the computer to the printer. You can have one or two types. A Centronics interface is ideal for printers and that type of interface is strictly used with them. The Sinclair Interface 1 contains an RS-232 interface which can be used with a printer or to perform other tasks, such as talking to other computers. So while the Centronics interface is printer-specific, the RS-232 is not.

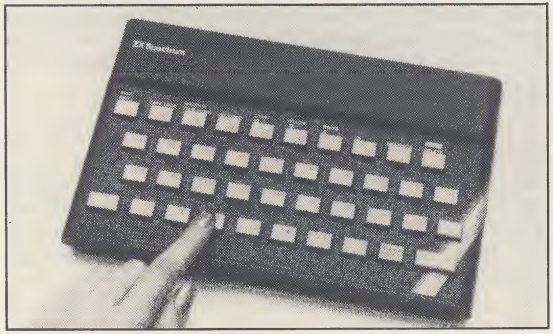
It is best not to buy a printer by mail order. Try to see a demonstration of one in a computer store and ask the assistant to show you how it works. Do not rely on manuals.

30. Why does my computer over-heat when it has been running for a long time?

It depends what you call over-heating. The computer will become warm and there is nothing you can do to prevent it happening. The heat will not damage the computer in any way, so you should ignore it. If the computer or the power supply seems hot and you are worried about it, you should go to your dealer and ask about the problem.

31. How do you get the user-defined graphics which are often put into Sinclair programs?

If you find a shape which is not on the Spectrum keyboard it



will be a user-defined graphic. Look for the part of the program in which the graphics have been designed. That will be in the form of a READ statement followed by DATA. If the data contains letters such as "a", "b", "c", they are the keys being used.

All you have to do is run the program, starting at the READ line. Then press the keys which are indicated in the DATA lines, after you have gone into GRAPHICS mode. When you have done that insert the graphics letters in place of the shapes in the listing. When you run the program the shapes will be defined.

Sinclair Programs and *Sinclair User* use a special graphics notation to denote which keys should be pressed for certain character displays. Everything in brackets in a quotation is graphics notation and should not be typed-in literally. Each instruction is separated by a colon. Graphics can start in one of three ways. An 'i' means inverse of the character which follows. A 'g' means that you must go into graphics mode before typing the characer and 'ig' means that you should use inverse and graphic at the same time.

32. What should I do if I have difficulties? Whom should I contact at Sinclair Research?

The first place to ring is Camberley 0276 681666 or 685311. That is where all deliveries are despatched and it is there that someone can tell you what to do if your machine should be faulty. If possible, avoid telephoning Cambridge. If you have technical queries which cannot wait, however, you should contact the Customer Relations Department on 0223 353204.

33. If I have a difficulty with commercial software, what should I do?
First go back to the software house concerned and ask it to solve the problem. If you have not received a reply within 28 days and the company belongs to the Guild of Software Houses you can seek assistance from that organisation. GOSH can be contacted at 71 Park Lane, Tottenham N17. The secretary is Mike Johnson.

34. What is telesoftware?
Listings of computer programs are stored on a central database. From there the programs can be sent along telephone lines to users who have computers.

35. What is Micronet 800?
Micronet is a series of databases into which you can link your Spectrum with a VTX-500 modem. The system offers telesoftware as well as news, reviews and software hints. It also allows you to gain access to Prestel, the Post Office database. The Micronet Spectrum modem costs £79 and more information can be obtained on 287 3143.

36. I have problems LOADing cassette programs into my computer. What is wrong?
The tone and volume controls of the tape recorder are not set properly. Try altering them in small graduations until you get the best combination. Unfortunately there is little else you can do.

37. I have difficulty with saving programs on to cassette. How should I combat it?
The quality of your cassette tape is important. You should try

to get low-noise tapes and set the tone level on the recorder to high. Make sure that the heads on your tape recorder are aligned properly and that they are cleaned regularly.

38. I want to buy a new keyboard for my computer. How should I choose one?
That depends whether you want to take your computer to pieces. Some keyboards will fit over the original keyboard casing of your machine but many require soldering to attach them. The easiest type to fit are those like the Memotech keyboard which clip in to the back of the computer, leaving the original casing free. Try to avoid keyboards which require a good deal of soldering as you may damage your machine.

39. I have heard that Sinclair machines use a Z-80A. What is it?
The Z-80A processor is what makes the computer a computer. It does all the computing and designates what each bit of the machine should be doing. It organises the memory and co-ordinates the input and output of informaton.

40. Finally, where can I obtain all the information about the world of Sinclair computers?
The best place is *Sinclair User, Sinclair Programs* or *Sinclair Projects.* If you want to keep up-to-date with the Sinclair scene, news and reviews, buy *Sinclair User.* Most of the best program listings are in *Sinclair Programs* and if you are interested in the serious electronics side of the computers, read *Sinclair Projects.*

Published by ECC Publications, 196-200 Balls Pond Road, Islington, London N1 4AQ
Printed by Cradley Print PLC, Warley, West Midlands.

CODE	ASCII	ZX81
0	NUL	Space
1	SOH	
2	STX	
3	ETX	
4	EOT	
5	ENQ	
6	ACK	
7	BEL	
8	BS	
9	HT	
10	LF	
11	VT	"
12	FF	£
13	CR	$
14	SO	:
15	SI	?
16	DLE	(
17	DC1	)
18	DC2	>
19	DC3	<
20	DC4	=
21	NAK	+
22	SYN	-
23	ETB	*
24	CAN	/
25	EM	;
26	SUB	,
27	ESC	.
28	FS	0
29	GS	1
30	RS	2
31	US	3
32	Space	4
33	!	5
34	"	6
35	#	7
36	$	8
37	%	9
38	&	A
39	'	B
40	(	C
41	)	D
42	*	E
43	+	F
44	,	G

CODE	ASCII	ZX81
45	-	H
46	.	I
47	/	J
48	0	K
49	1	L
50	2	M
51	3	N
52	4	O
53	5	P
54	6	Q
55	7	R
56	8	S
57	9	T
58	:	U
59	;	V
60	<	W
61	=	X
62	>	Y
63	?	Z
64	@	
65	A	
66	B	
67	C	
68	D	
69	E	
70	F	
71	G	
72	H	
73	I	
74	J	
75	K	
76	L	
77	M	
78	N	
79	O	
80	P	
81	Q	
82	R	
83	S	
84	T	
85	U	
86	V	
87	W	
88	X	
89	Y	

CODE	ASCII	ZX81
90	Z	
91	[	
92	\	
93	]	
94	↑	
95	—	
96	`	
97	a	
98	b	
99	c	
100	d	
101	e	
102	f	
103	g	
104	h	
105	i	
106	j	
107	k	
108	l	
109	m	
110	n	
111	o	
112	p	▀
113	q	▀
114	r	▌
115	s	▐
116	t	
117	u	
118	v	
119	w	
120	x	
121	y	
122	z	
123	{	
124	¦	
125	}	
126	~	
127	DEL	

Note: ZX81 Inverse Characters – add 128 to value.

ASCII Reference Table

MICRO COMPUTER PRINTOUT
A PLAIN MAN'S GUIDE TO PERSONAL COMPUTING

PROGRAMMERS CRIB CARD

Subscriptions £11.40 p a from
MicroComputer Printout, P O Box 2,
Goring, Reading RG8 9LN
Tel: 049162-798

Example: converting Hex to Decimal

E74B	=	E000	= 57344	= 59211
	+	700	+ 1792	
	+	40	+ 64	
	+	B	+ 11	

Example: Decimal to Hex

Keep on subtracting the largest possible decimal number in the table, i.e:

33715	Hex	
−32768	= 8000	= 83B3
947	+	
−768	300	
179	+	
−176	80	
3	+	
3	3	

Decimal to Binary

When converting Decimal to Binary, first convert to Hex and then substitute the four-digit binary code in the leftmost column for each Hex digit.

Example: Decimal 3290 =

Hex CDA = Binary 1100|1101|1010 = 110011011010

Example: Binary 10110100 = 1011|0100 = B4
= Decimal 180

pto

Binary-Decimal-Hex Conversion Chart

BIN	DEC	HEX	DEC	HEX	DEC	HEX	DEC	HEX
0000	0	0						
0001	1	1	16	10	256	100	4096	1000
0010	2	2	32	20	512	200	8192	2000
0011	3	3	48	30	768	300	12288	3000
0100	4	4	64	40	1024	400	16384	4000
0101	5	5	80	50	1280	500	20480	5000
0110	6	6	96	60	1536	600	24576	6000
0111	7	7	112	70	1792	700	28672	7000
1000	8	8	128	80	2048	800	32768	8000
1001	9	9	144	90	2304	900	36864	9000
1010	10	A	160	A0	2560	A00	40960	A000
1011	11	B	176	B0	2816	B00	45056	B000
1100	12	C	192	C0	3072	C00	49152	C000
1101	13	D	208	D0	3328	D00	53248	D000
1110	14	E	224	E0	3584	E00	57344	E000
1111	15	F	240	F0	3840	F00	61440	F000

